SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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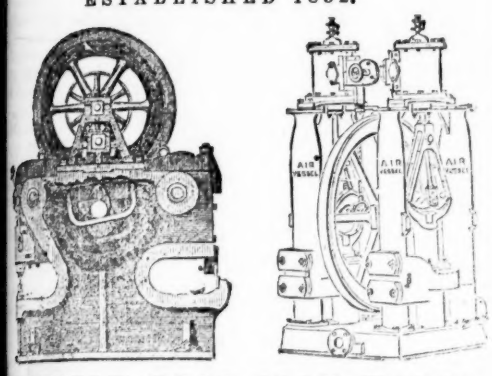

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PARIS, BRONZE MEDAL, 1867.

ORDER OF THE CROWN OF PRUSSIA.

FALMOUTH, SILVER MEDAL, 1867

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the Geographical Congress, Paris, 1875—M. Favre, Contractor, having exhibited the McKean Drill alone as the MODEL BORING MACHINE for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE McKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecutive weeks, ending February 7, was 24·90, 27·60, 24·80, 26·10, 28·30, 27·10, 28·40, 28·70 metres. Total advance of south heading during January was 121·30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tunnel, the McKean Rock Drill continued to work until the pressure was reduced to one-half atmosphere (7½ lbs.), showing almost the entire motive force to be available for the blow against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these Machines for the SEVERN TUNNEL; the LONDON AND NORTH-WESTERN RAILWAY for the FESTINIOG TUNNEL: and the BRITISH GOVERNMENT for several Public Works. A considerable number of Mining Companies are now using them. Shafts and Galleries are driven at from three to six times the speed of hand labour, according to the size and number of machines employed, and with important saving in cost. The ratio of advantage over hand labour is greatest where the rock is hardest.

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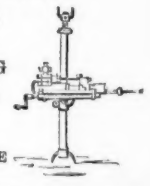

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4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN FOR MARKET AT ONE OPERATION.

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WASTE HEAPS, consisting of refuse chats and skimpings of a former washing, containing a mixture of lead, blende, and sulphur, DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly profit on our Nanthead waste heaps amounted last year to £600, besides the machinery being occupied for some months in dressing ore-stuff from the mines. Of course, if it had been wholly engaged in dressing wastes our returns would have been greater; but it is giving us every satisfaction, and bringing the waste heaps into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines, Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much pleasure in stating that a full and superior set of your Ore Dressing Machinery has been at work at these mines for fully a month, and each day as the moving parts become smoother, and those in charge understand the working of the machinery better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply, and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines, says—"Your machinery saves fully one-half on old wages, and vastly more on the wages we have now to pay. Over and above the saving in cost is the saving in ore, which is not much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The separation which they make is complete."

Mr. MONTAGUE BEALE says—"It will separate ore, however close the mechanical mixture, in such a way as no other machines can do."

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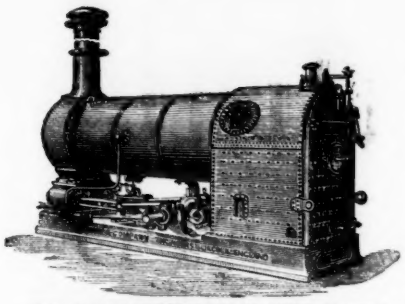

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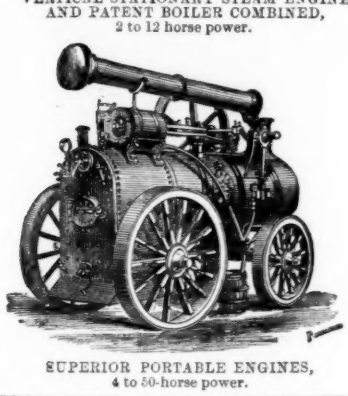

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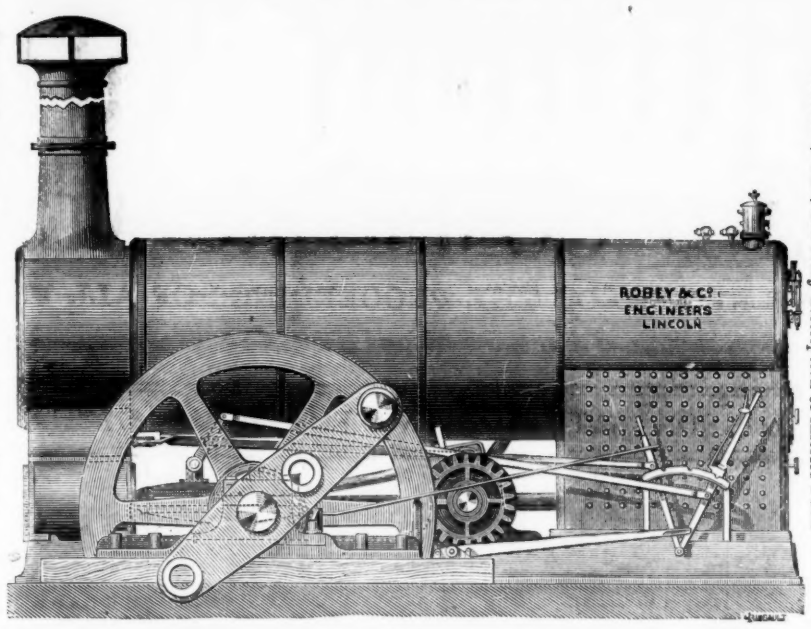

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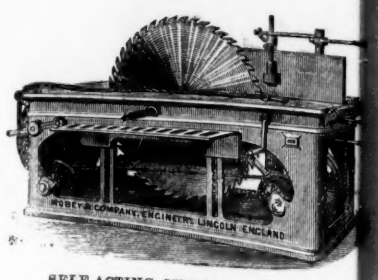

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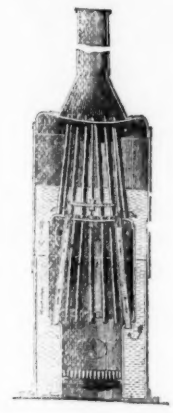

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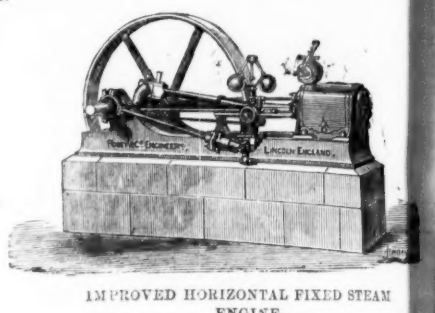

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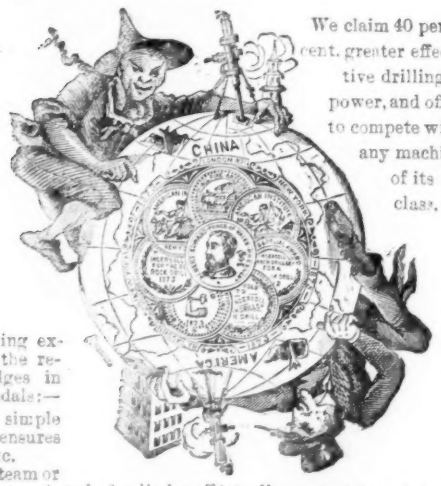

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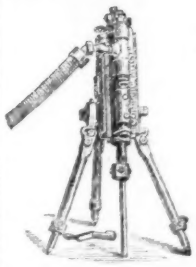

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BOILERS; AIR COMPRESSORS, worked by Hydraulic or Steam-power; STEEL for MINING DRILLS; PUMPS, and all other MINING MACHINERY supplied.

Extract from Capt. DRAKE'S Report to the Eberhardt and Aurora Mining Company, London:—"After having visited and carefully inspected the working of the principal patterns of drills used, particularly with reference to the tunnel works in the Comstock Mines, in California, we are pleased to believe there is no better drill than the 'Cranston,' which is doing most excellent service. The tunnel is driving through exceedingly hard limestone intermixed with quartz rock, which is all to blast. Since the arrival of new drills we have been enabled to let a contract for 500 feet, and we now average 50 feet per week."
The tunnel is now driven in over 2000 feet by their drills.

For other particulars and estimates, apply to—

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MANUFACTURE OF IRON AND STEEL.

Most iron ores contain phosphorus, generally in the form of phosphoric acid, which when exposed to the reducing agency of the blast-furnace loses its oxygen, leaving the phosphorus to combine with the pig-iron. Malleable iron, when manufactured from pig containing an excessive quantity of phosphorus, is apt to be brittle, owing to the difficulty of sufficiently ridding the metal under treatment of this substance. Steel containing something under two-tenths of a unit per cent. of phosphorus is unmanageable in the subsequent stages of manufacture. In the Bessemer converter, and in the open hearth furnaces, no appreciable separation of phosphorus takes place; hence pig iron containing much more than one-tenth of a unit per cent. is useless as a steel making material. Mr. Isaac Lowthian Bell is of opinion that the cause of this is due to the temperature of the puddling-furnace, and that of the steel processes reputed to being too elevated to permit the phosphorus to be carried off in the slags. He, therefore, proposes to expose fluid cast-iron to the bath of molten oxide of iron at a much lower temperature than that employed in puddling iron. These two substances are agitated together in any suitable way, but the mode which he has found most effectual is to introduce the two into a revolving cylinder of iron, lined or fettled like an ordinary rotating puddling furnace. To avoid cooling the melted iron and oxide he provides the revolving cylinder with a fire-place and chimney, by means of which he can raise the temperature of the cylinder before introducing the materials to be operated on, after which the heat is completely or partially shut off during the remainder of the process.

The moderate temperature at which the operation is carried on permits the phosphorus to be more perfectly removed than happens at the more elevated temperature of a puddling-furnace, owing to the longer retention of the carbon, which substance confers on pig-iron its fusibility. In the event, however, of the pig-iron containing an excess of phosphorus the carbon may be so diminished in quantity that consolidation takes place before the phosphorus is sufficiently well removed; in such case he adds a little more fluid cast-iron to the portion partially dephosphorised, and continues the operation as before. The purified iron may be then run out of the revolving cylinder as cast-iron for puddling, or the operation may be continued until the iron drops down, as it is termed, having the composition of steel, or carried on still further until it contains so little carbon as to constitute malleable iron.

The cast-iron is employed either direct from the blast-furnace or melted in a foundry cupola, or any other suitable apparatus, and the agent which Mr. Bell makes use of for the removal of the phosphorus is oxide of iron as it exists in the ores of this metal, or as it occurs in certain bye-products from other manufacturing operations. Among these latter may be cited slags from puddling, balling and other furnaces found in malleable ironworks, or other factitious substances in which oxide of iron is found in sufficient quantity for his purpose. In the selection of the oxide of iron, or compounds containing it, he prefers, for obvious reasons, those in which sulphur and phosphorus do not occur in excessive quantities. The oxide of iron may be melted in a cupola, or other form of furnace, or obtaining a sufficiently high temperature. When a cupola, or other kind of blast-furnace, is employed, care must be taken not to raise the heat to that point which would cause too copious a reduction of the oxide of iron to the metallic state, as he prefers merely fusing the compound containing the oxide.

Should the oxide of iron employed for carrying out his invention consist of this substance in so pure a form as to be easily reduced to the metallic condition, he prefers adding silica, or other earthy substance, either free or combined with oxide of iron, as they are found in iron ores or iron slags, so as to ensure fusion at that temperature which he finds best suited to his purpose. He has found that when the heat of the iron and of the oxide resembles that at which the metal is used for foundry purposes it answers extremely well. The streams of melted oxide of iron and of cast-iron may be conducted either separately or together into a vessel intended for mixing the two.

It is obvious that many forms of apparatus may be used for this purpose. A revolving furnace, such as that proposed by Mr. Danks or by Mr. Crampton for puddling iron, or that devised by Messrs. Tilley and Howson for a similar object, enables the operator to bring the fluids rapidly into that intimate contact which is required for the process. Any of these forms of furnace also afford the means of warming up the vessel in which the iron or oxide of iron are to be brought together, so as to prevent the mixture being too rapidly cooled by the sides of the apparatus, or in case it is desirable to retard the cooling of the contents of the vessel. This can also be done by the means used for maintaining a high temperature when any of these furnaces are used for puddling iron. The operation is continued at the moderate temperature hereinbefore described, care being taken to keep it below that point at which iron is rapidly removed from cast-iron, for it is essential to the success of his invention that the phosphorus should be almost entirely oxidised and transferred to the oxide of iron before the carbon has been greatly reduced in quantity. In practice Mr. Bell has found that when the iron and oxide are brought together at the temperature or thereabouts at which metal is run in an iron foundry the cast-iron under treatment loses almost the whole of its phosphorus, as well as the greater portion of its silicon and sulphur, while its carbon has been so lessened in quantity as to deprive it of the power to remain in a fluid condition before the close of the operation. In the event of the pig-iron containing an unusual percentage of phosphorus, or of the action being such as to incur a loss of the materials being thrown out of the vessel by the ebullition, the fluid cast-iron for each operation may be added at twice or thrice, according to the nature of the case.

The quantity of oxide of iron employed should at least be sufficient to take up the phosphorus of the iron without itself becoming unduly charged with this impurity, and he considers that when the percentage of phosphorus amounts to seven per cent. the oxide of iron becomes unfit for use, or at least that the employment of so impure an oxide is undesirable. When the two substances have been long enough in contact to effect the separation of the phosphorus, which generally happens in about five or ten minutes, the purified cast-iron can be run out by a properly constructed tapping hole. If Danks' furnace or one similar in principle is employed, or by inverting the revolving vessel, which is easily accomplished when the tilting furnace according to the construction patented by Messrs. Tilley and Howson is made use of, both oxide and iron can be cast, received in moulds, and separated in the manner practised in an ordinary refinery or running-out fire; or if the oxide is not so saturated with phosphorus that its action in purifying more iron is not seriously impaired, a portion of it can be retained in the vessel and an additional quantity added, varying in amount according to circumstances, after which the operation must be conducted in the manner already described.

The purified iron may, in case it is so desired, be run direct into a furnace or other form of apparatus, and converted direct into malleable iron or into steel by any of the well-known methods in use for either of these processes. Although the separation of carbon from cast-iron is greatly retarded by the low temperature at which phosphorus is carried off by oxide of iron, if the operation be continued sufficiently long the carbon may be so reduced in quantity that the iron is converted into steel, or if continued a still longer time it passes into iron in its malleable form. Before applying the requisite heat in order to fuse or weld the steel or iron, as the case may be, he prefers separating as far as possible the adhering oxide or cinder, because in raising the temperature to effect either of these objects a portion of the phosphorus is extremely apt to pass back again from the cinder to the steel or iron.

The separation of cinder from metal can be accomplished either by compression under a hammer or squeezer. It may also be done by fusing the metal in any easily fusible compound, such as a flux of lime and alumina, to which an alkali may or may not be added. By this last-mentioned method the metal is in a great measure cleansed from the oxide or cinder, after which it may be brought to a welding heat or melted into ingots, in any of the well-known forms of furnace used for these objects. Thus it will be seen that his method of treatment is essentially this:—Melted cast-iron is intimately mixed with melted oxide of iron in a furnace or vessel, in which they are maintained at a suitable temperature, such that no rapid separation of the carbon from the metal takes place, whilst the phosphorus for the most part passes from the metal to the oxide, which having thus become contaminated is removed from the metal, either before the cast-iron is by the separation of carbon converted into steel or wrought-iron, or if the oxide so contaminated is not removed before the conversion of the cast-iron into wrought-iron or steel then it is removed before the heat is applied requisite to weld the iron or fuse the steel.

INSTABILITY OF NITROGLYCERINE COMPOUNDS.

THE DYNAMITE EXPLOSION AT HAMILTON.

The report of Major V. D. Majendie, R.A., the Government Inspector of Explosives, upon the explosion of dynamite at Burnbank, near Hamilton, N.B., on June, 19, 1876, has just been issued. It appears that Messrs. Brand held a license for a general magazine, and were under the new Act entitled to use it until the end of June, 1876. The report states that the place provided for the storage of the dynamate—which, it may here be stated, was not constructed or situated as required by the license—having become partially flooded during the winter, the dynamite contained therein was found to be damaged, so much so that it is said it could not be exploded by the ordinary agency; and the British Dynamite Company, from whom it had been obtained, were communicated with on the subject. Meanwhile, it seems that Mr. David Brand, who acted as manager of the works at Hamilton, gave instructions to Mr. Clark, the engineer of the works, some time last spring to have the dynamite store cleaned out, by which Mr. Clark understood him to mean to have the mud and water which had collected in it during the winter removed, preparatory to the storage of some fresh dynamate to replace the damaged material. Whether in consequence of or prior to receipt of these instructions does not clearly appear, but about April 28 Mr. Clark admits having given instructions to Flannigan to remove the damaged dynamite from the magazine to the yard adjoining the joiners' shop, and after cleaning out the magazine to replace the dynamite therein. It is clear, however, from the statement of a boy called Brown, who carried the dynamite by Dickie's orders from the magazine, that the material was placed, not in the yard but in the shop. Flannigan died shortly afterwards, and Clark appears to have forgotten to have the dynamite replaced. About the first week in May Mr. Clark became aware, he says, for the first time that the dynamite was lying in the joiners' shop, and he asked Dickie why it was there; the latter replied that the reason was that new dynamite had been placed in the magazine, and he was afraid the old might do harm to the new. Mr. Clark then proceeded with Dickie to examine the dynamite in the joiners' shop, and came to the conclusion, which he expressed to Dickie, that its presence in the magazine would not be injurious to the new dynamite if placed beneath it. Mr. Clark states that he did not hear or see any more of the dynamite until June 4, when he again saw it in the joiners' shop. On June 6 he asked Dickie why it was still there, and the latter replied that there was no fear of it, for attempts had been made to blast with it, and it would not explode; whereupon Mr. Clark remarked that there now existed no reason for continuing to exclude it from the magazine, and it should not be kept any longer in the shop. He, however, appears to have taken no further steps to secure its removal, and says that he heard nothing more of the matter until the explosion.

On visiting the scene of the explosion, Major Majendie asked to be shown the dynamite which had been recovered unexploded from the joiners' shop, and which had formed part of the damaged dynamite originally removed thereto from the magazine in April. He was conducted to a small magazine, an excavation about 4½ feet square with a wooden floor, distant between 100 and 200 yards from the scene of the explosion, and about 9 yards from another small wooden magazine. He found therein the damaged dynamite. It was in a condition which in all his experience, except perhaps in cases where the dynamite has formed the subject of experiment, he had never seen equalled. Nitroglycerine was flowing freely out of the boxes on to the floor of the magazine, and on opening one of the 5-lb. packages he found the cartridges lying like sausages in gravy, in a liquid which proved on examination to be nitroglycerine. The paper wrappers of both cartridges and boxes were saturated, and were highly explosive. The cartridges themselves appeared to have parted with the larger portion of their nitroglycerine, and in some cases were little more than kieselguhr. The amount of nitroglycerine remaing in the cartridge varied however. Some cartridges which he tried to explode by means of the ordinary detonator, and which he tried to ignite by means of matches and pipe lights, would neither explode or burn, while a sample which was examined by Dr. Dupré was found still to contain 38·80 per cent. of nitroglycerine (in lieu of about 75 per cent.), the place of the expelled nitroglycerine having been taken by water. It was with great difficulty that he succeeded in producing an explosion of the cartridges at all. In some cases, as stated above, he failed, but at last adopted the expedient of establishing a powerful initial detonation by means of a cartrige of fresh good dynamite, and in this way the explosion of portions of the damaged dynamite was effected. Mr. McArthur, an Instructor in the employ of the British Dynamite Company, was present at these experiments, and he afterwards, by Major Majendie's directions, completed the explosion of the whole of the damaged dynamite by resorting to the same expedient of employing a cartridge of good dynamite as a primer. The floor and ground beneath the magazine and joiners' shop were taken up with a wooden spade and exploded, to remove further danger. The state of things disclosed by his examination of the damaged dynamite is important, as establishing the fact that the exudation of nitroglycerine from that dynamite was of so serious a character that wherever the boxes of the stuff stood, and for however short a time, they would be liable to produce saturation of the ground thereabouts with nitroglycerine, which also as it flowed from the box would be likely to flow on to and come into contact with any articles in the vicinity. The significance of this circumstance in its possible bearing upon the cause of the accident, assuming that at any period damaged dynamite of this character had rested in the corner where the explosion took place will be easily appreciated. It will also be perceived that if it is a fact that any dynamite of this character had at any time been present in this corner, it is not even necessary in order to account for the explosion to ascertain whether there did also at the time of the explosion exist any of the same dynamite, or indeed dynamite of any description whatever, for, as a matter of fact, the exuded nitroglycerine would be quite capable of furnishing the explosive power necessary to have produced the results observed, without the actual presence at the time of any dynamite properly so called. In short, the nitroglycerine which would have flowed into and mixed with the ground, would by so mixing have formed, in fact, a sort of dynamite, just as the exuded nitroglycerine had converted the earth which was under the floor of the magazine, and the ground near that part of the joiners' shop where the damaged dynamite is known to have stood, into what proved to be a powerful explosive of the character of dynamite.

After this investigation the liability of nitroglycerine exuding from dynamite cannot be doubted; for Major Majendie declares as the result of his enquiries that he has no hesitation in concluding that the only explosive (except harmless blasting fuse and possibly a few detonators) which had at any time been present in the building was dynamite. As to the question whether any dynamite other than new good dynamite had been present at any time in the corner where the explosion occurred, Major Majendie observes that there is the statement of the boy Brown that he deposited the damaged dynamite from the magazine in the corner opposite to that at which the explosion occurred, and there is concurrent testimony as to the continued existence of some dynamite in the corner in which the damaged stuff had been placed. There is also the fact that after the explosion about 66 lbs. of the damaged dynamite was found unexploded in this part of the building. This circumstance, however, does not render it impossible that some of the damaged dynamite may at one time or another have stood in the corner where the explosion occurred, and may have been there at the time of the explosion; and, it will be observed, there is the difference between the 66 lbs. of dynamite recovered after the explosion, and the amount originally brought from the magazine (probably from 150 to 200 lbs.) to be accounted for. It is, he thinks, impossible to resist the conclusion that the testimony of those witnesses who state that they saw boxes or a box of dynamite in this corner is perfectly reliable, not merely because this testimony is quite clear and unhesitating, but because it receives circumstantial confirmation from the circumstance that the explosion by occurring in this place establishes the fact that explosive was present there, and because from the nature of the effects produced it is evident that the explosion was that of nitro-compound, such as dynamite. Then, again, there is Rafferty's statement as to his having received an empty dynamite box from this corner, which box contained some pieces of a substance "like washing soda"—a description which applies very suitably to congealed nitroglycerine. If this statement is reliable it seems to establish the fact that there had at one time or another been in this corner some dynamite in an exuding condition, and it is, in his judgment, reasonable to believe that any defective dynamite which may have been in this corner was part of the damaged lot, which had accidentally (and, perhaps, contrary to Dickie's knowledge and intentions) found its way into this part of the shop, and not a portion of some fresh supply sent, it may be presumed, specially to replace the dynamite complained of.

As to the immediate cause of the explosion, Maior Majendie considers that the higher degree of probability attaches to what he calls the ignition theory, and a confirmation of his view is the statement made by Rafferty that the explosion was momentarily preceded by a bright blaze of light or flame which attracted his notice. He is not certain whether it was in the smithy itself, or whether it appeared through the partition; but in any case it was sufficiently marked to lead David Black (one of the deceased) instantly to call to someone to bring water to extinguish what he supposed was a fire. Rafferty on seeing this blaze, and being aware of the presence of dynamite, fled from the smithy, and was the only man working there who escaped with his life. He had only time to get clear of the door when the explosion occurred, which struck him down and injured him. Assuming a spark to have come into contact with the explosive (whether in the smithy or joiners' shop), some such effect as this would have been very likely to have ensued—that is to say, there would have been a blazing up of the ignited explosive until the accumulated heat or progress of the fire thus established produced the explosion of the unignited portion, and a short but appreciable interval of time might under these circustances occur between the first ignition and the resulting explosion. The suggestion that the explosion was most probably caused by a spark from the smithy forge is also quite consistent with the testimony of other witnesses as to the occurrence of two distinct explosions, as the fire first established became communicated with different portions of the explosive; or the fire may possibly have been established independently by a shower of sparks on to more than one portion of explosive of almost or exactly at the same moment. As to the serious question of where the responsibility rests for this disaster, and of the amount of blame attaching in connection therewith. There can, he thinks, be no doubt that, in so far as the accident resulted from a transgression of the terms of the license, Messrs. Charles Brand and Son, as the licensees, are primarily responsible, unless they can show that such transgression was in express disobedience to orders issued, and despite precautions adopted by them; and that it was committted without their knowledge, and in opposition to their wishes and intentions.

ELECTRIC LIGHTING.

Sir,—On the Continent great attention is now directed to the system of lighting by electricity; public places, streets, and places of amusement, workshops, warehouses, foundries, canals, harbours, course of rivers, steamers, &c., are supplied with it, and failure is seldom recorded. Mines are now under special notice, and the appalling calamity which has lately visited the Blantyre Collieries renders it imperative on all lovers of England that the subject should receive not only ventilation in public papers, but practical trials. In all probability that fearful explosion would never had happened had the colliery been lighted by electricity, for the simple reason that this kind of light is entirely independent of oxygen, and can quite as well fulfil its duties whilst entirely shut out from ambient atmosphere.

Placed far, so to say, between France and England, I am enabled more easily than the majority of Englishmen to have my attention drawn on to many new inventions of real value brought out in the former country, and to advocate or not, as the case may be, their practical utilisation in the latter. In this particular case I have for some time past followed with special interest the progress made towards the practical use of electricity as a means of lighting, and I propose now, in a series of letters, with your kind permission, to put before your numerous readers what has been formerly done, and what has been lately achieved.

The subject by its very nature will require rather lengthy comments, but its importance I hope will be a sufficient excuse for me, and if it is only to show that I am not entering upon a mere theoretical proposal I shall begin by the practical side of the question, and at once point out where the electric light can be and is being used, with what advantages or drawbacks. Then will follow a retrospective study of the problem, and afterwards its actual stage of perfection.

The apparatus more generally in use is Nollet's, giving a focus of light equal to 350 gas burners. Its description will come later on with the others; for the present it is only necessary to say that it can be and very largely has been employed by—

1.—Harbours and docks.
2.—Lighthouses.
3.—Steamers.
4.—For loading and unloading vessels at night.
5.—Men-of-war.
6.—Salvage societies.
7.—Mines generally, and especially coal mines.
8.—Large undertakings, whether railway, dock, or building constructions.
9.—Warehouses, works of any kind, timber-yards, foundries, engineering shops, spinning mills, &c.
10.—Military works in campaign or at home.
11.—Public streets and squares.
12.—Theatres, dancing and music halls, skating-rinks, and aquariums.
13.—Railway stations, tunnels, carriages, and especially goods depôt.
14.—Cellars and quarries.

I. Harbours and Docks.—The town of Antwerp has just now completed the fitting of the necessary apparatus for lighting by electricity the harbour, the mouth, and part of the course of the River Eslant The canal of the Marne to the Rhine is lighted by the same means, and to the great satisfaction of the sugar-houses there on the banks; the beetroots, of course, come to the sugar mills at a time when the nights are long and dark. With the electric light now the unloading of the barges proceeds as quickly and easily as in daytime.

II. Lighthouses.—By this system of lighting considerable saving can be effected. The report from Mr. L. Reynauld, the general inspector of the French lighthouses, shows that the daily cost of lighthouses lit by electricity is as compared to one lit by the best oil as 3 to 4, and that the light whether concentrated or reflected to the horizon is as 5 to 1. The cost of the uuit of light is thereby shown to be seven times less than with oil. It may be remarked that since Mr. L. Reynauld's report (1872) the apparatus have been greatly improved, and that one-third more light is obtained from them. The two lighthouses de la Hene (continuous light) are provided with electric apparatus, and that at the Cape Grisnez, opposite Dunge-

ness, one apparatus has worked for four years without any hitch, or necessitating any repair. There the light is intermittent.

III. LIGHTING STEAMERS.—By lighting steamers with electric light a greater security than hitherto obtainable would be given to navigation. The engines can, so to say, be drowned in light, and any accident can be detected immediately and repaired as easily as by daylight. It would facilitate the avoidance of collisions, and in case of accidents would permit the better protection of the passengers and crews against the aggravation of danger created by total darkness. Several of the splendid steamers belonging to the Transatlantic Company are thus lighted. The well-known Amerique, the Wille du Havre, Wille de Brest, &c., are amongst them. It is to be wondered at that the world-famed Cunard, Allan, and other Liverpool lines should be still behind their time. A. VASSARD.

Old Vicarage House, Greenwich, Nov. 14.

[To be continued.]

COLLIERY ACCIDENT FUNDS.

SIR,—It is not in any way my desire to reply to the numerous slanders that appear from time to time in the Journal in respect to myself, thinking it better to leave them to their own refutation. In the Journal of last Saturday, however, I find a statement to which I feel bound to give an unqualified contradiction; it is in the article headed "Colliery Accident Funds." It is there stated that "we have not the slightest hesitation in saying they frequently give their means to him"—that is to me, of their means. The statement is unqualifiedly untrue. It was a non-Unionist colliery. I never had from them a farthing; the men were under the special care of the manager and the owners conjoined, and they took good care that the people were so poor that they could afford to contribute to no object but that of adding to the employers' wealth. If the head of the firm gave 1000*l.*—like a good Samaritan, as the writer is pleased to call him—it is from the labour of the working poor that he became a millionaire. Whether I aided the people or not is no part of your business I opine. One thing I will affirm for them, that for what I have done gratitude is felt by many. Pray tell your readers how much gratitude has been expressed by them to any of your scurrilous correspondents. ALEXANDER MACDONALD.

Wellhall, Hamilton, Nov. 12.

METEOROLOGY, AND COLLIERY EXPLOSIONS.

SIR,—It is very evident that we all have a great deal to learn upon the question of explosive gases, and the manner in which they may or may not be influenced by the varying pressure and temperature of the atmosphere; it is, therefore, incumbent upon every one who is in any way responsible for the management of mines yielding fire-damp—and more particularly those which yield it suddenly and in enormous quantities—to be constantly and intently alive to the sad experience brought to bear upon the subject by the terrible accidents which year by year occur in our coal mines, and to endeavour to profit by them. It is manifest that it is of the utmost importance that scientific as well as practical knowledge should be brought to bear on the management of mines, if accidents are to be reduced to a minimum. When we find that some of the worst accidents upon record have taken place at collieries which have had the advantage of the advice of most eminent mining engineers, it does indeed show that the anxieties of colliery managers and consulting engineers are not light ones, but in many cases they are not, I fear, sufficiently appreciated.

The incendiary language recently used by the hon. member for Stafford is un-Christianlike, uncharitable, and uncalled for, and it has excited great indignation amongst colliery owners and managers, who knew it to be wickedly false to accuse them of murder. I can and do sympathise most fully with any honest indignation expressed on behalf of the poor fellows whose lives have been sacrificed to such an extent, but do not let it be done by doing gross injustice to others; and I hope that the thousands of manly colliers in all districts—many of whom are well known to me personally—will express their dissatisfaction at, and their disagreement with, the rash expressions referred to.

My remarks as to anxiety apply with great force to the opening out deep collieries in new districts where the character of the mine for yielding gas, and that suddenly or not, has all to be learned, and cannot be predicted beforehand, as I have had satisfactory experience to be afterwards alluded to. As regards a fall in the atmospheric pressure there can be no doubt that it does to some extent influence the amount of fire-damp given off in certain mines. I have known cases where an examination of certain "clay dams" (made to stop off old roads and goaves to keep out the air, which would have occasioned "gob fires" by "spontaneous combustion") would always indicate to a person accustomed to those pits and their symptoms, the state of the barometer from the varying quantites of gas (from *nil* to a maximum) which exuded around the dam as the atmospheric pressure altered. The largest quantity given off was never really large, but the proportions were an unfailing index to the change of pressure, and this gas manifested itself slightly before the indications of the barometer.

Considerable experience was gained as to pressures of the atmosphere and of fire-damp after the terrible accident at the Oaks Colliery in December, 1866. The pits were closed for nine or ten months, and by means of pipes through an air-tight scaffold in one of the downcast shafts hourly experiments was made as to the pressure of gas given off from the mine. Mr. T. W. Embleton, with whom myself and others were associated in closing these shafts, has given a valuable paper in Vol. 25 (1876) of the Transactions of the North of England Engineers upon those pressures. One remark (page 36) is very significant:—"It would appear from the above table that the change of pressure sometimes slightly preceded the rise and fall of the barometer." This shows that an attention to the barometer alone as a warning that gas might be found or expected without a continual vigilant inspection by a safety-lamp would be too late. At the same time I wish it to be distinctly understood that I look upon the barometer as a most important and necessary instrument to be attached to every mine, and to be most closely watched and recorded. It is the most perfect instrument we are acquainted with, and should, therefore, be prized accordingly; but its action is a little behind that of the deadly enemy we wish to guard against. Mr. Embleton says (page 37):—"It appears, therefore, that the change of pressure did not depend upon the actual height of the barometer, but upon the rise or fall of the barometer at whatever height that instrument might be at the time."

I advise a careful reading of this paper, and also of several papers in the same Transactions, vols. 17 and 25, upon some enormous and violent outbursts in 1867 and 1870, from the floor of the Silkstone seam at the St afford Colliery, near Barnsley. I had experience of several such outbursts at this colliery in 1863 and 1865, when the gas issued from the floor with a noise like high-pressure steam escaping from a boiler, and extinguishing the Stephenson safety-lamps for a distance of at least 2000 yards. Up to 1863 these outbursts were unknown in the Silkstone seam (I had experienced them before in the Barnsley seam, at the Oaks and Lundhill Collieries), and I was almost laughed at for feeding the ventilating furnace with "fresh air," as all experience of that seam up to about 1859, when I put in the furnace, went to show that, although fire-damp was given off in opening the coal (driving headings) there were no large quantities given off afterwards. Experiments made by Mr. Miller, the present manager, as given in volume 25 of the above Transactions, show that the gas in some cases was at the fearful pressure of 135 lbs. per square inch. It is manifest, therefore, that under such circumstances the issue of gas could not be due to a falling of atmospheric pressure alone—indeed, I question if any of it was due to that cause. The gas existed in a state of great tension—possibly almost, if not quite, in a fluid state—until the weight was removed from the floor by working away the coal. Instances are upon record where in a heading large masses of coal have been thrust off by a violent outburst of gas at a fault. In such cases no watching of the barometer could guard against accident.

The only remedies or precautions I can think of are:—

1.—Powerful ventilation by a fan, capable of being largely increased at a moment's call.

2.—The use of the very best safety-lamps, regardless of cost (these, in my opinion, are Stephenson's), and a most vigilant care taken of them, stricter than the strictest martial law.

3.—The total disuse, or, as near as may be, of blasting in "fiery" mines, but wherever "blasting" is indispensable, as it will almost be in some cases, it should not be done when the bulk of the men are in the pit, and never when lights (safety-lamps) are in use near goaves or old workings. We have a great deal to learn yet as to the effect of "blown-out shots" upon the air, even for long distances, in a mine; and the tendency to pass the flame through the gauze of the lamp, which might probably be concurrent with a sudden discharge of fire-damp occasioned by the same concussion. Mr. Galloway, one of Her Majesty's Inspectors of Mines, has broached this most vital question in a paper read before the Royal Society, and I commend the matter to the most serious consideration of colliery managers.

4.—The managers of collieries insisting upon the men carrying out the provisions of clause 30 of the Mines Regulation Act, which empowers the workmen to make an examination of the mine once a month. This would elicit many valuable hints I have no doubt, at all events it would prevent many remarks being made afterwards that the pit was unsafe, &c.

5.—An earnest teaching to the workmen by the precept and example of the manager and his officers of the necessity of daily and hourly care and compliance with the rules and all regulations, and that the safety-lamp should be looked upon as a thing almost sacred.

It would be well if the representatives of the men, who ought to speak and write with some influence and authority, would talk more to their hearers about care, regard discipline, compliance with rules and regulations, proper use of safety-lamps, &c., instead of inflaming their minds with charges of "murder" against owners and managers, "all for the sake of working cheap coal." Let owners, managers, and workmen believe they are all interested in the safety of the collieries and of human life, and much more will be done to prevent such fearful accidents as we are all pained to read of, even if, happily, we have not to witness the misery and anguish of mind consequent upon them. JOHN BROWN, M.Inst. C.E., F.G.S.

Hednesford, Oct. 30.

THE VENTILATION OF PITS.

SIR,—In the midst of such fearful colliery explosions, and in view of the possibility—nay, probability—of their occurring again and again, it becomes us all, in the interests of humanity if for no other reason, to investigate the cause, and try if effectual means cannot be taken for its eradication.

There are two agents in these catastrophes fatal to the lives of the miners. These are fire-damp, or methyl hydride, having a formula of CH_4 and a density of 8; and choke-damp, or carbonic acid, having a formula of CO_2 and a density of 22. The former, it will be seen, is lighter and the latter heavier than air. The fire-damp is the primary evil, and is the gas which causes the explosion. The immediate presence of choke-damp is the second evil, and is the after result of the explosion, in which all the pure oxygen present has been consumed. If the miners have escaped the result of the explosion they cannot escape that more terrible and more fatal enemy the choke-damp, and that is the point I wish especially to refer to. If we had means—and I do not see why we should not—by which the choke-damp could be immediately removed, I believe that not a half, and it might be not a tenth part, of the deaths would occur. Few of the men are burned to the extent necessary to cause death, many not at all; by far the greatest number succumb to the fatal choke-damp. The system of ventilation by currents of fresh air is not sufficient, as the choke-damp, being heavier than air, remains persistently at the bottom of the pit, and cannot easily be replaced by it. The only efficient way is to pump it out as we do the water. An air-pump by means of which the carbonic acid could be removed would speedily be followed by the rushing in of pure air from above, as we know a vaccum cannot exist where air is allowed to penetrate. Ventilation by a current of air may agitate the choke-damp and drive it from one part of the pit to another, but it cannot raise it to the pit mouth on account of its high specific gravity. Again, so far as the fire-damp is concerned, it requires very efficient ventilation indeed to render it innocuous, as it explodes violently even when diluted with ten times its volume of pure air. Let there be an air-pump as well as a water-pump attached to every pit, and let the pit air be renewed every morning before the miners resume work. Should this idea appear practicable to those whose duty it is to superintend the ventilation of pits, I trust it may be at once taken up, and that no efforts on our part may be spared to render this wholesale destruction of miners a thing of the past. G. C.

DETECTION OF FIRE-DAMP.

SIR,—I read with much pleasure the proposition of Dr. Reece in last week's Journal for using a balloon upon a lever to indicate the presence of fire-damp in mines. The suggestion is undoubtedly good and simple, although by no means new. It was described by a Parisian correspondent more than 20 years since, and at one of the first workmen's industrial exhibitions in London—that held at the Floral Hall, in Covent Garden—Mr. Wilkinson (at least I believe that was the exhibitor's name) exhibited a precisely similar apparatus. This was, I believe, just about the time of the introduction of Mr. Ansell's indicator, which I am inclined to think, although after so long an interval I cannot speak positively, was exhibited by the side of it. Mr. Wilkinson's apparatus consisted of an extremely light copper ball about 4 in. diameter, balanced precisely as Dr. Reece suggests, and perhaps the greatest reason that it has never been adopted is that the opinion is very general among colliery managers that if you do too much to remove responsibility from the men you create a greater evil than that which you seek to remedy; if fact, you are like the Yankee doctor who, "not being posted on pustules," ordered an unfortunate patient who was suffering from small pox to adopt a dietary to produce cholera, telling him at the same time that if he could only get cholera he could cure him, as he had been told by an old woman that cholera could always be cured by patience and castor oil. Of course, I cannot say whether the Yankee treatment was correct, as I am not a medicine man, and perhaps even Dr. Reece may attribute it to the Yankee dabbling in a business he did not understand, although he may think even a doctor could properly and safely manage a colliery. Engineers, however, entertain a different opinion, and as they are accustomed to the management of collieries perhaps they are correct after all.

But it may be acknowledged that Mr. Wilkinson's invention would not materially increase the danger of the mine in which it might be placed, even if it did not increase the safety, and what applies to this applies equally to Dr. Reece's suggestion. With regard to Lord Kinnaird's letter, however, which was published in the *Mining Journal* of Nov. 3, the case is widely different, since he advocates the adoption of an apparatus, the use of which would beyond the shadow of a doubt double the annual loss of life in connection with colliery operations. The reason has been more than once explained both in the Journal and in the Times. Mr. Ansell himself stated in the report of his experiments printed by the House of Commons that if his fire damp indicator were left only 30 seconds too long in the foul air it "registered backwards," and could not, therefore, be depended on. Has Lord Kinnaird forgotten this?

Durham, Nov. 13. ENGINEER.

RICHMOND MINE.

SIR,—The magnificent returns made by this mine must give great relief to the minds of anxious shareholders. Only a very short time back the mine was to be given over to the Eureka Company, to pay the costs of the lawsuit. The cry was, "Get rid of your shares at any price; take Potts' ore away and the mine is a dead one:" \$75 per ton of ore was raised last week from this dead mine, and 1000 tons of ore smelted. The previous week's return was \$64 per ton: \$80 was made in the week ending Sept. 30, but then only 600 tons of ore was treated. A large amount cannot possibly result so satisfactorily as a small lot, because there must naturally be less care in the selection of ore smelted. Should these returns be kept up for some time to come there must be sufficient profit to lay by for any reasonable law costs and expenses, and pay 5*s.* per share monthly dividend. If this was a mine new to the market, and had smelted over 100,000*l.* worth of bullion in two weeks, I am inclined to think that some of the dealers would be off their heads in the market, not knowing how to fix a price. I have the authority of the *Mining Journal* for saying that other mines in the district hold good in depth, and I must give my support to the Richmond, fully believing it will come out well. I know nothing of the time when Richmond stood at 15 prem., but I do know of 16*l.* per share being paid.

RICHMOND SHAREHOLDER.

THE RICHMOND MINE.

SIR,—The circular sent out by the directors is of a most encouraging nature, and shareholders can now in some degree of certainty calculate the value of their shares. We are told that the expenses are nothing near so heavy as they formerly were, owing to reduced fuel and richer ore. A weekly yield of \$55,000 is sufficient to pay a dividend of 22*s.* 6*d.* per share per quarter, or 90*s.* per annum, and leave over 40,000*l.* to carry forward.

The directors would not have announced a dividend if they had not been tolerably satisfied there was a good prospect before them. Why the market should have been so startled at this dividend announcement I cannot see. When we consider that 33,000*l.* was carried over in last account, and nine weeks' runs made profit of 40,000*l.*, it is very certain that a part of it might be spared. I am more surprised at the amount to be divided—10*s.* per share could easily have been given. RICHMOND SHAREHOLDER.

FLAGSTAFF MINE.

SIR,—The shareholders ought to be much obliged to Mr. Snell for his letter published in last week's Journal, setting forth a letter he had received from the secretary; and on the other hand I cannot help agreeing with the complaint of your other correspondent as to the conduct of the directors in not communicating often and more fully with the shareholders. As Mr. Snell is evidently taking an interest in the matter, and will understand what is necessary to be done to compel the directors to come before the shareholders, I feel sure that I am but expressing the wishes of the shareholders generally in hoping that he will take some such steps at once. No doubt there is the question of expense that would be involved on his part, but I feel equally sure that the shareholders would vote him the repayment of expenses. AN OLD SHAREHOLDER.

Nov. 15.

THE NEW QUEBRADA AND THE BOLIVAR RAILWAY COMPANIES.

SIR,—In the Journal of Sept. 8 and 22 you published letters from me referring to the prospects of the mines and railway owned by the above companies, and with your permission I now propose to consider the events that have transpired during the past month, and to offer a few further remarks.

It may be well to remind you that I am not a shareholder in either enterprise, in order to reply beforehand to a query that may very probably be put to me, as to why, such being the case, I occupy the columns of a journal with my ideas as to the management by the companies of their properties. To such a query I reply that shareholders cannot but appreciate any information tendered them by persons who have had opportunities of studying the properties in which their money is invested. Few shareholders have time or opportunity for becoming even slightly acquainted with the true nature of those properties, and thus the greater portion of the proprietary body are dependent upon the official information afforded them by the board of directors through the medium of reports which, as a rule, are vague and meagre. It appears, therefore, to be advisable that knowledge of a company's affairs (especially when gained whilst in the service of the company) should be made public, in order that, as far as possible, shareholders may see all sides of the question, for then, even if the information given be not worth having, they will be ready all the more to appreciate that given officially. With this preface I proceed to consider the report issued by the direction of the New Quebrada Company on Oct. 19, the report being in itself a justification, if any be required, of the numerous letters that have lately appeared upon Quebrada matters in the mining and financial papers, for the direction appear thereby to have been animated into giving the shareholders information as to the progress of the mines and railway, and the conduct of the business generally. With reference to that report, I am unavoidably compelled to criticise the management. I have for years past steadfastly upheld the value of the Bolivar estates (of which the New Quebrada Company own one-third), and it is in the management alone that I can discover reason for the fall that has again occurred in the market value of the property.

To take the points as they occur in the report—a statement is given of the quantity of ore raised from the Aroa Mine during the year, from which it appears that in only two months out of seven has the quantity of poor and richer ores combined come up to the tonnage required by the agreement with the Bolivar Railway Company. True, the agreement did not come into full force until the railway was completed to the mines, and this has only just been done, but it was scarcely politic to defer the full development of the output until the last moment. The management apparently take credit for only keeping up "the very moderate force of men stated in Mr. Darlington's report." The number of working miners given by Mr. Darlington was about 100. Is it possible that more than 100 miners could not be either procured in Venezuela or taken there from elsewhere? The construction of the railway has been dragging its slow length along for years (many months of valuable time having been lost by the fact that a portion of the line above the River Agua Linda was taken through a vast swamp instead of being carried round it above flood-water mark, and on firm ground), but of late the locomotives have been drawing nearer and nearer to the mines, and yet the management has only kept up "a very moderate force of miners," although they were under contract to send down to the coast by the railway company at the rate of 20,000 tons yearly, commencing from the day the engines should run up to the mine. If more than 100 miners could not have been employed profitably in the known levels and saloons of the Aroa Mine, there were plenty of profitable work for a large force of miners during the few months in the exploratory works that are now, the report says, delaying the production of ore. There is evidently plenty of ground to work at in the Aroa Mine, and there are other known lodes waiting development.

The report says that orders have been given to cease stoping the yellow pyrites until the Bolivar Railway Company will assist the Quebrada Company to make them profitable. Further on it is said that the directors have (at the eleventh hour) plans before them very carefully matured for reducing these ores to a regulus. What can the Bolivar Railway Company have to say to the question? They have constructed their railway under a contract to carry from the coast 20,000 tons of ore yearly for the Quebrada Company at the rate of 4*l.* 5*s.* per ton (about 1*s.* 6*d.* per ton per mile), and the Quebrada Company have guaranteed that quantity. Is it at all probable that having secured such a good bargain the Bolivar Railway Company will go out of their way to assist the New Quebrada Mining Company to lower the quantity by smelting or any other of the reducing processes? If the bulk be reduced and the price increased no advantage would accrue to the Quebrada Company, while the Bolivar Railway Company would still further improve their bargain, as they would have to carry less bulk, and consequently incur fewer working expenses, less wear and tear, &c. Therefore, that the policy of the Quebrada Company should be to raise the required quantity in ruby ore alone, and to send down the low pyrites reduced to a regulus, for which latter purpose there is an abundance of rough timber in the immediate vicinity of the mines, and coal within a reasonable distance of the line of railway. There does not, however, seem to be spirit enough in the management for this, but the merciful consideration of the Bolivar Railway Company is hoped for to allow the Quebrada Company to smelt or reduce their ores, as though the Bolivar Railway Comp

were the owners of the mines. The report says that at present the ruby ore has to be relied upon to enable the management to comply with the spirit of the agreement with the railway company, but according to the statistics half the tonnage required by the agreement has not yet been mined in ruby ore in any of the first seven months of this year. It is evident, therefore, the spirit of the agreement has not been maintained by the management of the Quebrada Company, and the shareholders are, therefore, dependent probably upon the Bolivar Railway Company not only as to whether they may smelt or reduce their yellow pyrites, but as to whether they shall work the mines at all.

It is somewhat unfortunate that the brief description of the works proceeding at the mine, given by Mr. Darlington, affords little information to any shareholder unable to compare the remarks with the detailed drawings of the mines, which are, doubtless, open to inspection at the company's offices. To others who have not that privilege, and are, consequently, dependent upon the diagrams and pictorial sketches (of, apparently, unfathomable caves) issued with Mr. Darlington's report of last April, the present information conveys no definite meaning. I observe that Mr. Darlington now refers to "German workings," but there is no mention of any such workings in his report or in the diagrams attached thereto. Spanish workings are therein shown, but these cannot, I presume be identical with the German ones, as the Spanish workings properly so called were in the upper portions of the lode, and were, consequently, closed up by the fire that took place in the mine in 1839, and which has been referred to by a "Shareholder" in your issue of Sept. 8. It appears now to be certain that these old workings in the richest parts of the lode have not yet been explored by the present management.

In the early part of this year copper was falling in value, and the increased supply coming in from almost every quarter of the globe seemed to make it a foregone conclusion that in face of the consequent dulness of trade the market value of the metal must continue to fall. Nevertheless, ships were chartered for Tucacas before the completion of the railway offered even a plausible excuse for sending down the poorer classes of ore from the mine to the coast, and before any scheme for the reduction of these ores had been prepared. This anxiety on the part of the management to bring home cargoes to the shareholders, who, having waited in vain for so many years to see some of the output of their mines, had almost begun to look upon the whole affair as a myth created for purposes of Stock Exchange speculations, was, perhaps, excusable, but the market continued to fall rapidly, and the first cargoes of ore did not come up to the standard of richness that had been hoped for, surely then it would have been the proper course to have telegraphed instructions to the management in Venezuela to have stopped the shipments altogether, and to have made default in the remaining charter parties, paying the estimated amount of damages which would have been equal to the freight agreed upon. The company would then have lost the freight only, probably 25s. per ton; well may the shareholders beg to be saved from their friends for the promptness of the local management so highly praised in the report as having saved demurrage and fully 10s. per ton in freight, was actually the cause of a loss of from 2l. to 3l. on every ton of ore sent home. The directors regret the dispatch of the yellow pyrites, but the shareholders will regret the dispatch of any of the ore, the quality of the best parcels being so little above the standard that Mr. Darlington showed in his report was required to pay all costs of getting the ore to the market in Swansea.

Mr. Darlington stated that, given a price per unit of 14s., then ore of 12 to 13 per cent was the lowest percentage that could be shipped without positive loss. Taking this data we shall find that sales of about 5000l. has been made on the ore sent to market up to the 6th of this month. The total amount sold has been 2272 tons, which has realised about 6l. 10s. 11d. per ton, or a gross total of about 14,870l.; and the same tonnage, at Mr. Darlington's figures, would have yielded 19,880l. There has thus been an average loss of about 2l. 4s. per ton. It is evident that the local management committed the error of sending home any kind of stuff that could be sent down from the mines, but the home management might have stopped the shipments in time to have saved the loss of at least 1l. per ton on all the later cargoes by paying the freight and allowing the vessels to seek cargoes elsewhere. For the local management to have exercised sound judgment, and in the face of the fact that only poor ores were available, to have sent the ships away empty would, probably, be too much to hope for; but it would be interesting to know whether any attempt was made to find freights for these vessels either in Puerto Cabello or La Guayra.

The result of this year's operations have afforded a convincing proof of the soundness of the policy that I have repeatedly recommended to the New Quebrada Company—that it would be profitable to pay attention to the timber and other products of the company's lands, as well as to the working of the mines. There are many products that might easily be made useful adjuncts to the company's business, but the timber trade recommends itself specially on account of the rapidity with which it can be developed, and the extent to which it could be carried. In a report made by me to the directors of the New Quabrada Company in 1869 I find the following:—

> At the time of my departure I left a very large stock of well selected timber—mahogany, cedar, zebra wood, partridge wood, fustic and lignum vitæ. The cost of this timber when placed on board will not have exceeded 2l. per ton. With the limited resources at present at Tucacas, with the addition of a few articles of plant, &c., as provided for in the estimates appended to this report, at least 1000 tons could be shipped monthly. The average value of the woods may be taken as 8l. per ton in the English markets, the cost of cutting and loading on board at 2l., and the freight home and other charges at 2l. per ton. A profit of 3l. per ton may, therefore, be looked for, and the timber growing on the company's lands may be made a valuable adjunct to the enterprise. During the past 12 months I have sold several parcels of woods of various descriptions to the merchants of Puerto Cabello and La Guayra both for exportation and for use in furniture and other work in Caracas. These sales were rendered necessary by the absence of remittances from London, but were made at prices leaving the company a clear profit of from 30 to 50 per cent. Thus fustic costing $14 per ton put down in the wharf at Puerto Cabello has been sold at from $16 to $25. Mahogany costing 2 reals per cubic vara, has been sold at 16 reals, and lignum vitæ costing $11 the ton has sold at $14 and $16. These prices realised on the spot prove that a profitable business can be carried on.

The cargoes of timber I cut in 1869 came home to London, and realised good profits on the outlay involved in the transaction. Prices are now much about the same as they were then, and the cost of cutting and freighting home should also be about the same. Here, then, it is clear that great loss would have been avoided if the local management had had 2000 or 3000 tons of timber ready for shipment home, at a time when vessels were in harbour, and none but poor ores being raised at the mine.

The sales of ore this year, although made at a loss, through error of judgment in sending poor ores to an overstocked and falling market, have proved important facts for some years past, asserted to be true by everyone that has visited the mines, but which the shareholders that the company has met with have always seemed to disbelieve—that there was plenty of ore at the Area Mines, and that the ore was of a character easily reducible. It is, however, necessary that the mines should be worked on a liberal scale, and unless this is done the shareholders need not look for any return on the large amount of capital sunk in the enterprise. Unfortunately, the report under notice does not hold out much hope that such a policy will be inaugurated, for it is clear that the mining superintendent is kept so short of labour that he is obliged to shift his men from one part of the mine to the other, instead of being able to attack all the workable points simultaneously. The supply of native labour is expected to increase upon the completion of the railway, but surely it has been a mistake to allow the development of the mines to wait for this, and thus to leave the line when completed without work. The report, however, affords reason to believe that the correspondence referred to in the third paragraph of this letter has not been without effect, for the workings above Carthew's level, formerly productive of rich ore, are at length to be explored.

The mining superintendent is also to have the assistance of an assayer and accountant. Can it be possible that a competent assayist is only now being sent to the mine? Another of Mr. W. W. Bird's suggestions must also be adopted—that the ore should be subjected to some process of sorting or hand picking before being sent down for shipment. Smelting or other reducing process must be commenced without further delay. There is plenty of firewood in the immediate neighbourhood of the mine, whilst space for furnaces and ore ground is available at the Palace if the narrow width of the ravine precludes their being situated nearer to the mouths of the levels.

Mildmay Chambers, Nov. 15. E. D. MATHEWS,
Assoc. Inst. C.E.

[To be continued in next week's Journal.]

TONITE EXPLOSIONS.

SIR,—It is now little more than 12 months since the three almost concurrent accidental explosions of tonite at West Basset Mine, during the charging of bore-holes, from one of which one man was killed and another seriously wounded. It will be remembered that the unfortunate and misleading statement in the instructions issued by the Cotton Powder Company that "there is no danger whatever in loading a bore-hole, or mine, so long as the cap, or primer, is not inserted," was very strongly commented on by the coroner and condemned by the jury, several of whom proposed to return a verdict of manslaughter against the writer of the paragraph in question; but as an irreconcileable difference arose between sections of the jury, some of whom proposed only to censure the company, they were eventually discharged by the coroner without returning any verdict whatever. The occurrence gave rise to much correspondence in the Journal and local papers at the time, and other accidents of a similar kind were referred to as proving conclusively that tonite is by no means so harmless as the manufacturers represent it to be, and that it does occasionally explode most unexpectedly and with dangerous effect. We now learn from the Whitehaven Guardian of Nov. 1 that a tonite accident occurred on the preceding Saturday at the Montreal Mines, Cleator Moor. "A miner named Waterson and a boy having bored a hole, proceeded to fill it with tonite, and the cartridge while being forced into the hole with a wooden stemmer, exploded, and Waterson was severely injured." It cannot be too strongly impressed on miners and all persons interested in mining operations that all explosives are manufactured for the purpose of being exploded, and with the intention that they shall explode. When and how depends on different circumstances. Some explode from one cause, some another. No one acquainted with the subject can doubt that it is highly dangerous to force any explosive down a bore-hole when the cartridge is too large to pass down easily. This is more especially the case with tonite or cotton powder and guncotton, each of which is prepared in a rigid, unyielding form, and the grating and friction of which against the hard gritty sides of the bore-hole must almost of necessity, on the application of any considerable force, cause an explosion to take place. Ordinary gunpowder, we all know, is easily poured down, or introduced into, a bore-hole without the application of any force whatever, but as it explodes from a spark, care is required to avoid one coming in contact with it, and hence it is that the Explosives Act prohibits the use of an iron bar in ramming down the first layer of tamping.

The great immunity from accidents in blasting with dynamite arises from the double reason that a dynamite cartridge is soft, and not rigid like tonite, and that hard tamping is not required, a little sand, or soft clay, or even water, being all that is necessary or desirable in the place of ordinary tamping. The lives of our miners are too precious to be carelessly trifled with, and the responsibility of those using the more dangerous explosives is so great that they ought certainly to be more careful than many of them appear to be, and all ought to practise and enforce the greatest—

Truro, Nov. 7. CAUTION.

HORSE-SHOES, AND ASPHALTE AND WOOD PAVEMENT.

SIR,—As your valuable Journal is not only the organ of the mining interest, but a record of every novel and useful mechanical contrivance, I venture to make a communication on the above subject, which at the present juncture is exceedingly important.

It is obvious to every resident and visitor in London that the asphalte with which our streets are laid, and even the wood pavement, which is some improvement, are unsuitable, especially in the great thoroughfares, which are more trodden by the hoof of horse and foot of man than any other thoroughfares in the world. Indeed, the inadequacy of the asphalte has been so universally felt, both in London and Paris, that paving with wood has been resorted to, especially in the latter great city, London following the example there set; but already our Paris neighbours find that wood will not answer, and our own experience affords us literally serious ground of complaint. If any person will take the trouble to stand for half an hour, or even half that time, in any spot where one part of the roadway is paved with wood (or with asphalte), and the other part laid down in the old way, he will perceive that the omnibus and cabdrivers go as much from their own side as they dare in preference for the stones, avoiding wood asphalte as much as possible. The writer of this letter stood on Saturday last on the west side of St. Mary-le-Strand, and observed that the drivers invariably confirmed this remark.

It would excite no surprise that they should do so, for, notwithstanding the comparatively noiseless way afforded by wood or asphalte, so dangerous are either to horses that the old stone way must of necessity be preferred, at all events, by owners and drivers of horses.

Along Threadneedle-street, Cheapside, and the other most crowded streets, the fall of horses is constantly witnessed, and "another horse down" resounds on all sides. This is more particularly the case with teams. Sometimes heavy vehicles are drawn "tandem," sometimes "unicon" fashion, the old habit also prevails of yoking one horse and having two leaders, frequently three horses "in file" and even "four"—still more wasteful of force—are all seen slipping along, adding difficulty to their progress, and danger to the animals.

Horses are frequently disabled, and even killed, and the peril is increased, as after a short experience of the unsafety of their progress they become timid, and are more obnoxious to accident. Some large owners of horses, such as the London Omnibus Company, omnibus proprietors, Pickford's, and cab-owners, have endured great losses, and would be glad of any prospect of relief. Where two horses are abreast or there is a team the fall of one horse endangers more than one—he plunges and kicks his otherwise more fortunate companion, or is trodden upon while prostrate. Harness is torn and carriages broken during these struggles, drivers are precipitated to the ground, passengers in public vehicles alarmed, sometimes these vehicles are overturned, traffic is obstructed, passengers on important business, telegraph bearers, and letter-carriers are impeded on the side ways and at crossings, and children pressing forward in their curiosity cut, bruised, or maimed.

The *rationale* of all this mischief lies in the nature of the new processes for laying road-ways. On a wet day wood or asphalte is simply intolerable; on a sunny day it is like travelling over glass; in frost all the damp that is absorbed, and very little is with asphalte especially, forms a clean and broad sheet of ice. It is customary to overlay with sand, which with difficulty knits into the hard laid wood, and the asphalte is impervious to it—consequently the streets are muddy, muddy to a degree previously unknown after rain or the water-carts have passed over them. Very heavy loads rut the asphalte, and tears the wood. If a cart of bricks, or timber, or iron comes to grief, deep indentations are made, causing a new class of inconvenience and peril.

Under these circumstances the patent horse-shoe is a desideratum. It is so formed as to suit in shape and adaptation to the delicate foot of the animal for which it is designed, and, instead of presenting a broad smooth iron to the glistening pavement, it is constructed with iron or steel curves, which take hold of the smoothest surface and secure from slipping. A patent has been secured which ensures safety until we have secured better material for roads, or rather until the newest material overcomes prejudice, and finds general support. Specimens of these shoes may be seen at Mr. Taylor's offices, 447, Strand (West).

An experienced veterinary surgeon says of them "they are light, durable, neat in appearance, constructed of the best material, reasonable in price, and safe."

Mr. George Fleming, F.R.G.S, F.S.A.L., Member of the Council of the Royal College of Veterinary Surgeons, says that the shoes remedy the defects of caulking, and the grooves or concavities into which they are channelled secure against slipping. Owners of horses will be advised well if they call at the office for the patent and judge for themselves.—*City, Nov.* 12. ED. HY. NOLAN.

INCREASED CONSUMPTION OF TIN.

SIR,—The paper read before the Royal Geological Society of Cornwall, by Mr. W. C. Borlase, and referred to by your Cornish Correspondent in last week's Journal, is one in which every Cornishman should take an interest, but from the very character of pure tin I much doubt whether Mr. Borlase's hopes will ever be realised, for there can be no question that wherever strength is required the tin-plate (that is, tinned iron) is much superior to pure tin, and wherever it is a question of ornament tin would always occupy a very subordinate position. The Treloy pan is, no doubt, an interesting antiquity, and I will not even dispute with Mr. Borlase that it may date back to the fourth century, although the ascertion is probably open to question, but I contend that what might have suited the Cornish gentry of the fourth century would not necessarily be approved of in the nineteenth century, and that there are some of us who believe that in the fourteen centuries which intervened some progress had been made, even recognising the retrogression of the dark ages. Emerson's notion that "that which Nature at one time provides for use she afterwards turns to ornament" was not, in my opinion, intended to apply to tin, or if it were so intended Emerson must surely have had very little tin to form his opinion on. Even taking the best lamb and flag there is nothing attractive in it for ornamental purposes any more than there is in aluminium, to introduce which for ornamental purposes so much effort was made some few years since. Such metals always have a dull and depressing appearance as ornaments, and can only be used to a very limited extent to show forth the more favoured metals to greater advantage.

First with regard to Mr. Borlase's suggestion that tin should be generally used for dinner services, it certainly might happen that some would like to possess such a service as a curiosity, just as some prefer the old pewter platters of our forefathers, but although a rump steak may be kept warm a few minutes longer on pewter than on porcelain this advantage is altogether counteracted by the unpleasant softness of the cut when pewter is used. A knife sharp enough for the steak is too sharp for the pewter, and the consequence is that the platter bottom becomes a mass of deep scratches and dirty ditches, which are anything but agreeable to the eye. Pure tin would be, of course, softer than pewter, and the peculiar unwholesome looking yellow tinge certainly does not add to its attractiveness. The fact, however, must not be lost sight of that tin can be hardened by the addition of very little antimony or arsenic, so little indeed that there is not the slightest fear of anything injurious resulting to the users. But as the object is to extend the consumption of tin I certainly think that it is not to the culinary department that we must look for assistance, unless indeed it be by getting a new alloy of tin with some other metal, as nickel, for example, which alloy shall be so hard, brilliant, and durable as to replace both best white metal and electro-plate.

The price of tin at the time Mr. S. H. James had his dinner service made was extremely low, and it is only when it is so depressed that so large a service as that mentioned could be produced of similar quality for 50l. For the interest of Cornish mining we must have some new application of tin, which will secure its use with the metal at 100l. per ton, and not at 75l., as at present, and this I feel convinced can only be hoped for by finding a new alloy with some special properties. Tin has been found valuable for piping through which to conduct mineral oils for consuming them after the manner of gas, but the softness and the readiness with which it breaks has prevented its general use. Alloys with lead and similar metals have proved worthless; but for tin-piping, which could be handled as easily as "composition" pipe, the demand would be enormous.—*Truro, Nov.* 13. LAMPIST.

MINING IN KESWICK DISTRICT, CUMBERLAND.

SIR,—As reference has already been made to that most valuable mine, the property of the Saddleback Mining Company, who are sending to surface splendid heaps of rich silver-lead ore—indeed the large lumps are really fine specimens of a large and rich vein—a proof of the vast riches and wealth of this mineral field will be borne out by the fact of immense riches having already occurred to the fortunate shareholders, who have taken the mining interest at heart, and have followed it up in this neighbourhood with spirit and energy. The very great deposits of ore (galena) and the rich lodes of copper, containing a large percentage of silver, were discovered in that famed mine, Goldscope, which gave highly remunerative dividends for a great number of years. This mine possesses four large lodes, two of which are silver-lead producing; the other two are copper lodes. The two latter are caunters to the galena veins, which run a long distance through the valley of Newlands, after which they enter the breast or slope of the mountain of that name. From the elevated position of these veins adit levels were most advantageously commenced on the direction of the lodes, although the backs or surface outcrop could only in places be seen, owing to the drift or debris having been washed down from the adjoining hills. Therefore the bearings of the lodes and the point of their intersection could not be accurately ascertained.

It is said by historians that this mine was an important one in the twelfth century. That the surface openings made on the backs of the veins were made in remote ages is beyond doubt. In more recent dates excavations have been made in the surface outcrop, as also on the backs of other lodes in adjoining royalties, and large quantities of ore have been got and sold. These pipes of ores have been followed by old miners down to the depth of 6 or 8 yards only, when in consequence of quick water they had to be abandoned; the operators being of the labouring class had not the means to provide mechanical power for haulage and drainage purposes. However, these men knew well of the great wealth and importance of these lodes, and again commenced operations by opening shallow levels from the mountain side, but only to again cease working from the want of capital.

In 1854 the sett was leased to a private company, whose great object was to drive the adit level on the copper lode to the place of intersection with the silver-lead vein, and great activity was displayed. The surface work was also extensively carried on, the making of dressing-floors, erection of machinery, washings, jiggings, &c., thus absorbing their capital before having reached the ore, and they were obliged to sell the mine in 1846 for the moderate sum of 4500l.

The new company, also a private one, consisted of five gentlemen only. They wisely drove the adit level 60 fms. to the junction of veins, where abundance of ore—both silver-lead and copper—was found to exist. The lead lode was here about 12 ft. wide, carrying with it in one solid leader of that metal 3 ft. wide, with four or five smaller ribs, from 1 to 10 in. in thickness—making altogether one solid mass of rich galena, 4 ft. to 5 ft. in thickness; the length of this run of ore at the adit was 15 fms. The ore continued to the surface to a height of 30 fms. It also held down to the 82 below the adit level; the bottom level was a good one, the ore-bearing ground was nearly 50 fms. long, with a solid leader 14 in. wide. From this extraordinary body of ore princely dividends were made. The great deposit of copper at this junction must not be overlooked. It held good about the same length as that of the lead, and yielded 4 to 5 tons per fathom of upwards of 20 per cent. produce, and which also gave large profits. In 1853 the mine became the property of a single gentleman (an original shareholder), who died in about two years after. The mine was then carried on by the trustees for the benefit of his children. The mine continued to make large profits till the year 1864, when the shaft was sunk to the 90 fm. level in a good lode. To reach this depth the machinery was brought to the full extent of its power, and could no longer perform the work allotted to it.

The question then came as to the introduction of new pitwork from top to bottom of shaft, together with powerful water-wheel and other powerful machinery, or to abandon the mine. Although the bottom of the mine was very profitably worked, even down to the 90, the trustees did not feel disposed to make such a large outlay, and they abandoned a rich mine.

There are other virgin setts in this district, and under the favourable auspices which indicated the great riches already described. I shall comment in a future paper on a mineral property in this vicinity which contains five large lodes, forming important intersections, and will open a rich undertaking to an enterprising company.

TOURIST.

BORING MACHINERY IN CORNISH MINES.

SIR,—The circular of Mr. G. L. Basset's agent as to the amount of work done at Carn Brea by the Diamond Rock Boring Company's Percussion Drill cannot but be regarded as highly satisfactory, as it, to my mind, shows that machine mining will keep many mines in profitable work which would otherwise have to be abandoned. The drill was started on June 18 in the 226 fm. level, and by Nov. 3 had progressed 70 fms. 6 in. Now, as the time is exactly 20 weeks, the rate of driving was actually 3½ fms. per week. The ground was estimated for setting by hand labour at 7 ft. per month, so that the progress with the machine was more than twelve times as great. It is true that in this case there was a premium for speed, but still the difference is enormous.

With regard to absolute money outlay there is no saving, for Mr. Bolden in his circular states that there was an increased cost over hand labour so far as the actual drivage was concerned. There are, however, in many instances advantages to be gained by boring machinery which it may be considered more than counterbalance this increased cost; amongst others, the compressed air may be utilised in other parts of the mine, enabling men to work at all times with greatly increased results. This trial has satisfied Capt. Teague that the mode of boring and blasting adopted by the Diamond Rock Boring Company has produced larger results than the method generally in use in Cornish mines, and, taken as a whole, it may be considered that quite as large results have been attained as were expected. There is at least this to be said with regard to machine drilling which Mr. Basset's agent does not mention. Assuming the main drivages to be done by machine, just twelve times the number of men could be employed at the end of six months as would be possible at present.—*Illogan, Nov.* 12. PROGRESS.

SUCCESSFUL MINES, AND MINE CAPTAINS.

SIR,—I notice in your valuable Journal of Sept. 22 Mr. Murchison's reply to my remarks the week previous on "Successful Mines, and Mine Captains." In the first place I have not the least desire to show envy nor a jealous feeling, but simply the very great possibility of the want of judgment in mining being the first step in throwing aside economy. Although I have had over 40 years' experience in mining—from a boy dressing ores at surface up to a superintendent—I agree with Mr. Murchison that I am ignorant not only in many instances happening in and about Tankerville, but in mining generally, on the ground that a miner is never fully learned in that branch of industry; and on this ground I contend all those who have the handling of large sums of other people's money for the benefit, more particularly, of the working class should be closely examined in their mode of operations, and those that cannot stand such examination let them succumb to their deserts. With regard to Tankerville engine-shaft being sunk on one side of the lode, Mr. Murchison contends that they do so for saving time—that they can sink 9 ft., while only 6 ft. could be sunk on the lode. We all know that time is money, but on this point I beg to differ with Mr. M., and presently I will try to give my reasons, but in accordance with what I have said I have no desire whatever to show envy, more particularly with Mr. Murchison, as he is a gentleman I know nothing about, except through the columns of your Journal, in which he seems to stand high in the mining circle.

With your permission I will try to explain the difference of sinking by the side of a lode, similar to Tankerville, compared with sinking on the lode, but not having the expense per foot or fathom paid in the Tankerville Mine, allow me in this case to estimate such. Taking Mr. Murchison's figures, or rather the difference in the amount of ground they sink compared with what could be sunk on the lode to be about one third, to this end we will suppose Mr. M.'s shaft to cost 20*l.* per fathom, while a shaft sunk on the lode would cost 30*l.* In the next place, according to reports from the mine, the lode opposite the engine-shaft has yielded from 2 to 5 or 6 tons of lead per fathom. With this view, and for a guide, I venture to estimate the average to be 3 tons per fathom, and at a safe figure of 12*l.* per ton.

Sinking on the lode 10 fathoms, at 30*l.*		£300
Contra.		
3 tons lead per fathom (10 fms.), 30 tons, at 14*l.* 18s...	447	
Leaving a profit of		£147
Sinking 10 fms., at 20*l.*...	£200	
Cross-cutting to and through the lode at bottom of shaft (say) 3 fms., at 10*l.* per fathom ...	30	
Cost of bringing down and fixing the pump preparatory to cutting the lode (say)	20	= 250
Total		£397

By the above it will be perceived that by sinking on the lode they profit 147*l.* in 10 fathoms; while, sinking as they do, they are out of pocket 397*l.* Of course, my figures are only estimates, but if the right figures were put down it is a question whether the balance would differ much from this. Mr. Murchison said lodes vary in their underlie. This is true, but a regular defined lode like the Tankerville seldom varies much, and in such case, where a mine is opened so deep, it is easy to get at the average underlie; then start the shaft accordingly, and having a shaft some 7 or 8 ft. wide, the lode cannot be very regular if the principal parts do not keep in the shaft. No real practical miner can say that his opening must be in the country rock off the lode, when it can be on the lode; and when Mr. M. has his shafts on courses of the lode, with an incline railroad for hoisting (say) from 3000 to 4000 lbs. of stuff in one car, and that car going from the bottom of his mine to surface, discharging the stuff and returning to the bottom of his mine to be refilled in 3½ minutes, and other arrangements throughout the mine in accordance—throwing aside the wretched system of hoi-ting with kibbles, and other useless traps around—he can then talk of able and energetic management. A MINER.

Portage Lake, Oct. 22.

CARDIGANSHIRE MINING.

SIR,—Although the mines owned by the Cambrian Mining Company have been proved beyond question so exceedingly rich, yet scarcely a week elapses without an attempt, by means of letters in the Journal, &c., to throw mud at the Cambrian Company. These attempts all emanate from the neighbourhood of Aberystwith, and are unworthy of notice except as a reflection of the animus that pervades a certain section or that choice community. Many ingenious theories have been started from time to time to account for the fact of there being so much mineral property unworked in Cardiganshire. Now, Sir, with your permission, I will very briefly relate my experience of Cardiganshire mining. I first became intimately connected with mining in that part of Wales in August, 1875, since which time I have been the means of many thousands of pounds being expended in the county. No miner or merchant has ever had to make a second application for money to any company with which I am connected; neither have any disputes in reference to money matters ever arisen. The mines I have put to work have been the cause of several surrounding properties being put in operation, and I think I may, without egotism, claim a share in the revival of Cardiganshire mining. I wish it to be distinctly understood that I do not profess ever to have expended 1*l.* in mining in Cardiganshire on philanthropic principles. My expenditure has been made with the object of benefiting myself; but an expenditure of money, whatever the object, cannot but benefit those who receive it, and through them the locality where it is expended. However, because I am not a Welshman, and have too much respect for myself to solicit or accept the co-operation of the impecunious busybodies of Aberystwith, the companies with which I have to do are constantly attacked in various ways in the most cowardly and contemptible manner. These attacks do not hurt me, financially, in the slightest degree—they disgust me. Depend upon it, Sir, the class of persons I have referred to, who are always scattering broadcast their libellous abuse of other men's pies into which they have not been allowed to thrust their dirty fingers, are doing more damage to Cardiganshire mining than any other cause.—*Nov.* 14. A LONDONER.

CARDIGANSHIRE MINING.

SIR,—In last week's Journal I read one of the most sensible letters that has appeared for some time in reference to mining in Cardiganshire, and can endorse fully all the writer said. What is wanted there is not costly surface machinery for dressing and other purposes before any ore is cut, but the capital laid out underground, under honest and practical management, then the mines would pay. There are still many good properties standing idle which with but a small outlay would bring in most gratifying results. The other day I had been paying a visit to the Dynin Slate Quarries, and on my return to Aberystwith, close to the village of Tredol, I saw a little above the road a large pumping-wheel working, and when opposite I met an intelligent old miner, who it appears was in charge of the works. I got into conversation with him, and was surprised at what he related. On asking him if the mine was being worked he said—No, but he expected it would be ere long. From what he told me there are splendid lodes both of lead and copper ready for cutting, which can be seen any day, the mine being in fork. I asked him how it was that such a good thing was abandoned. His answer was that it was all through the management, and added that if the present owners only had a little pluck they would soon have a good paying mine. In proof of what he said he took me to the dressing-floors, and showed me a large pile of really splendid-looking lead ore ready for dressing, containing at least 20 tons of pure lead. How such a property is idle really astonishes me. Some of your readers may, possibly, think on reading these lines that the writer is personally interested in this property, but such is not the case. I casually met the old miner, and believe he told me the truth. If a few private capitalists were only to go into Cardiganshire, and select one or two good properties, and get a good practical manager who would do his duty, I feel certain they would be well repaid for their outlay. T. K.

PROFITS OF SLATE QUARRIES.

SIR,—An advertisement of the Dynin Slate Quarry appears in the *Mining Journal* for Nov. 10, in which it is asserted that I have made statements as to the profits realised by the slate quarries of North Wales. This assertion was first made many years since by a Welsh Slate Company, in a circular which had a wide circulation. When my attention was called to this, I made the company recall as many as possible of the circulars issued, and cancel the objectionable paragraph in all. Notwithstanding this, from time to time I have been greatly annoyed by the re-appearance of this incorrect statement. I have, therefore, no alternative but to ask you to allow me to assure your readers, in a prominent place in the Journal, that "I have never on any occasion ventured to make a statement relative to the profits obtained by working slate quarries."

Jermyn-street, Nov. 12. ROBERT HUNT, F.R.S.,
Keeper of Mining Records.

PEMBROKESHIRE MINERALS, &c.

SIR,—Some months ago, under the above heading, I remarked that a railway to St. David's connecting the Great Western would tend greatly to develope the mineral as well as other traffic. I have now to report that the railway project is being gone into vigorously, the necessary surveys are being got up for parliamentary deposit, &c. The proposed line is from Clarbeston Road to White Sand Bay, near St. David's Head, and this place, the site of which is eminently suitable for a watering place, will undoubtedly well repay the promoters of the scheme. Tramways as feeders to the main line from Roach to Nolton Collieries will also be made.

The lead mines at Llaneilw have lately been surveyed, and a company, I believe, is to be formed to work them, while I have no doubt but the copper and other mines in the neighbourhood will be proceeded with on the railway communication being an accomplished fact, of which there is every reason to believe it will be, as the supporters of the project, although their names have not yet been made public, are such that every confidence may be placed in the ultimate accomplishment of the undertaking. I also hope that the development of the several branches of traffic I have named will be carried out, and that I shall shortly have to report further progress with regard to the minerals of Pembrokeshire, &c., in which I naturally take great interest.—*St. David's, Nov.* 12. E. T.

THE ROTHSCHONBERGER ADIT.

SIR,—An article in the Supplement to the Journal of Nov. 3 states that "this tunnel is the greatest work of the kind that has ever been undertaken to aid the exploration of a mining district." When completed it is said that its length will be about 31½ miles. The writer of that article must have been ignorant of the great Gwennap adit, sometimes called on account of its superior extent the "County Adit," which was commenced by an ancestor of the Messrs. Williams, of Scorrier, in the year 1748 to unwater Poldice and other mines; it drains most of the mines in Gwennap, and several in Kenwyn, Kea, and Redruth; its total length with the numerous branches is about 33 miles. It commences near Ferny Splat, in Cosgarne Manor, and unwaters the Consolidated Mines, Clifford, Wheal Squire, Ting Tang, Pennance Consols, Wheal Maid, Wheal Jewell (old and new), West Jewell, Wheal Damsel, West Damsel, Wheal Gorland, Wheal Pink, Wheal Clinton, Wheal Unity, Wheal Unity Wood, Killifreth, Creegbrawse, Great Wheal Busy, Hallenbeagle, Wheal Rose, Wheal Chance, Treskerby, North Treskerby, North Downs, Wheal Prussia, Wheal Peevor, Treleigh Wood, and a few others. It was commenced by Mr. Williams to drain Poldice, of which he was the manager in 1748. Other mining companies subsequently carried on the adit to their several mines. At the present time the cost of keeping the adit in repair is paid by the companies who use it. North Treskerby Company have only recently extended it to that mine, where its depth is about 30 fms.; its depth in Pennance is 70 fms. R. SYMONS.

Truro, Nov 12.

P.S.—What the total cost was it is impossible to say, but if we assume 6*l.* per fathom as the price given, including the numerous ventilating shafts, and take three miles as the length, the cost would have been 174,240*l.* R. S.

D'ERESBY MOUNTAIN.

SIR,—A rather important discovery of lead has recently been made at this mine on what is locally known as the "Gors lode." In the ages gone by very large excavations have been made at different places on this lode above and below the No. 4 adit, one or two extending from this adit to the surface. It is close to or in one of these excavations that the lead I now speak of has been discovered. The lode itself is from 30 to 40 ft. wide, the part bearing lead being from 29 ft. to 30 ft. The lode is overlaid by a course of shale about 4 ft. wide, the richest part being next to it. Further towards the heading or footwall there is a course of blende mixed with the lead, worth in one place about 4 tons of the former to the fathom. There is not to be found, as might be expected in a lode of such magnitude, a great deal of solid lead; but suppose for the whole width that is now lead-producing it should yield only ¼ ton of lead per cubic fathom, the facilities for breaking it will render it a very profitable concern, for it is like quarrying out the stuff; but the first fathom next to the shale is worth more than treble that amount.

The present discovery is about 15 fms. from surface, and by clearing and extending the level towards the mountain a very great depth, at least 60 fms., it will be obtained; then under this is another level, close on 20 fms. deeper, so that a mine can be opened on this monster lode by adit levels to a depth of 80 fms. When the deepest level is cleared I fully expect that there will be stopes opened from surface down to that point.

I would not like to overdraw the description, or allow my imagination of the future to rove wildly, but if my expectations be not verified analogy goes for nothing, and inductive science relative to mining may as well be thrown to the winds, and we give ourselves up solely to chance. JOHN ROBERTS.

TREBEIGH CONSOLS MINE.

SIR,—As one of the earliest and largest shareholders in this enterprise I should feel much obliged by your allowing me a short space to appeal to my fellow-shareholders as to the future conduct of the mine. At the first starting of this adventure it was talked of changing it into a limited liability mine as soon as it had been sufficiently proved at shallow depths, and I would strongly urge upon the proprietors the prudence of this course now if they would not subject themselves to these ever-recurring calls, and the almost certain eventual loss of their money. It may be asked why this should be the case more under the present cost-book plan than under the limited liability system, and I would suggest in reply that in what is at present so pure a speculation as this holders of shares do not feel much disposed to keep paying calls to which there seems no visible termination, and which do not when paid in the least advance the market value of the shares. Furthermore, that the small driblets of capital thus coming in from such irregular payments are quite insufficient to carry out the work of exploration with sufficient vigour. But seeing that the sett is an excellent one, highly mineralised, in immediate contiguity to some of the best mines in Cornwall, and the quality of the lead of the highest class, there only needs in all probability a moderate but certain sum and good management to make it a success, and to a limited liability scheme no doubt the public would give their support. I feel sure that with the prospect of such a change as indicated backward payers would at once make an effort, and clear off arrears, because their shares would assume a definite market value, and there would not be the constant sense of "throwing good money after bad" that they now have, with the uneasy distrustful feeling that while one is paying another is holding back, ending at last in the wreck of all.

About 7000*l.* has been already called for, and 4000*l.* more would, I apprehend, be quite sufficient to give the sett a thorough trial, since machinery and plant are already provided. I should be very glad to hear the views of other shareholders more versed in these matters than myself, but meantime I would strongly urge upon them the advisability of taking some decisive steps if they would make the mine a success, and save their money.

A HOLDER OF 200 SHARES.

P.S.—I would suggest an issue of 8000 shares at 10s., reckoning the present shares at that price, which present holders would be well satisfied with, the total capital being thus about 10,000*l.* With such a moderate capital anything like success in discoveries would ensure a handsome return. I think holders have much reason for complaint that there was no report of the late meeting in the *Mining Journal* of Saturday last.—*Nov.* 13.

CORNISH MINING.

SIR,—The advance of 10*l.* per ton in the price of tin metal has been followed by a rapid rise in the value of good tin mine shares, some of which have risen in market value over 400 per cent., while there are still many among the good mines of Cornwall which have been unduly depressed far beyond the intrinsic value of the properties which must also in their turn become a profitable source of investment; for instance, Wheal Basset, a mine in 512 shares, with a plant worth 12,000*l.* to 15,000*l.*, paid the shareholders 73*l.* per share in dividends, or a total profit of 374,784*l.*—forced down through circumstances too well known to miners (the low price of mineral) selling for about 25*l.* per share, or less than the value of the machinery on the property (some few years ago the shares were marketable at 400*l.* each), its prospective value being second to no mine in the county, recent discoveries, and important points soon to be reached, together with the advanced price of tin, fully warranting a rise in the price of its shares equal to any mine since the revival of Cornish tin mining, and the investor in it will shortly quadruple his money. Another mine is East Wheal Lovell, some few years since the shares of which were marketable at 35*l.* each, forced down by the same circumstance to about 2*l.* 10s. per share. The recent rise in the value of tin, coupled with discoveries, will soon have its effect on the price of shares here too. There are several of such properties in the county open to the investor to enrich himself, requiring only prompt action to attain the object, and experienced men look forward to the ensuing spring to see the leading mines of the county (now selling at a ridiculously low figure) in such a state as shall revive the remembrance of the brilliant era of Cornish mining of former days.—*Cornwall, Nov.* 14. CHARLES BAWDEN.

THE CATHEDRAL MINE.

SIR,—I have read the various letters which have appeared in the Journal respecting the management of this company, and cannot but express my surprise at the cool intimation that a shareholder who feels so disposed may join the purchaser in his possession of the property. I most certainly must sign myself a "Dissatisfied Shareholder"—and for this reason, that no statement of accounts have been forwarded: no particulars as to how and when the purchase was arranged; and what may be the present position of the old shareholders. DISSATISFIED SHAREHOLDER, No. 3.

CATHEDRAL MINE.

SIR,—Will you allow me to correct one or two inaccuracies in a letter from "A dissatisfied shareholder" of the above mine in last week's Journal. Your correspondent says that I am one of the original directors, but this is not so, as I was only elected on the board on March 24, 1876, and as there has not been a meeting of directors since that date I could not have had much to do with the management of the company. I certainly thought it my duty to attend the sale of the mine when in liquidation, and purchased the property at an almost nominal price, but this was to prevent it from falling into other hands, and so being lost to the original shareholders. As a very small capital will now be required to work this valuable property, dissatisfied shareholders will have the opportunity of joining the company on the same terms as myself, of which he will be duly informed.—*Blackheath, Nov.* 14. JAMES LABY.

PATELEY BRIDGE LEAD MINING AND SMELTING COMPANY.

SIR,—Success now attends the development of this group of grand old mines. Centuries of exploration have shown that wherever operations of any kind have been pursued this exhaustless treasure-house has never yet failed to abundantly reward those associated with it. Records are extant proving that lead to the value of at least 1,000,000*l.* sterling has been returned with the most primitive appliances and ineffective working. For the past four years it has given handsome dividends; yet, as results are showing, its ore-producing capabilities have never been tested. Centuries of intermittent—yet withal most profitable—working have failed to imperfectly explore its many productive veins even to water level. There are many thousand fathoms of ground containing many hundred tons of lead ready to be taken away as soon as more extensive scale of operations shall be prosecuted. Unjust the mines would it be to blame them for the tardy way in which they have yielded up their riches; rather should that be ascribed to the real cause—mismanagement. No sooner had uncontrolled power been vested in the only man who should have possessed from the outset than the mines resume their former productiveness. To Capt. Charles Williams, the manager, alone is due the present success, and it is not too much to say that had Capt. Williams had the management from the beginning the results now being realised would have been achieved at least 12 months since, and shareholders receiving satisfactory dividends.

The prospective value of the discoveries now being made cannot be over estimated, proving as they do that the greater the depth the richer the lodes. The deepest point of operation is by far the richest—the 30 fm. level east, on Rake vein, is now yielding from 6 to 7 tons of lead ore per fathom. In one day last week this point alone p

duced 6 tons of ore. The company has an extensive property, the richest portion of which is not yet under development—the portion containing the most productive lodes is so advantageously situated as to ensure their speedy and economical development. It is but just to say that it was Capt. Charles Williams' urgent advice at the initiation of the present company to set apart a portion of the capital to sink a shaft in the eastern ground, where some rich veins would have been opened upon, but Capt. Williams' advice was then unheeded. Its value is evident, and what is now taking place testifies to the correctness of the opinion that a shaft sunk in the Sunniside section of the property will open out a lead mine equal in extent and value to any in the United Kingdom. My object in troubling you with this communication is that "honour should be given to whom honour is due."—*Nov.* 14. A LARGE SHAREHOLDER.

[For remainder of Original Correspondence, see to-day's Journal.]

Meetings of Public Companies.

WESTERN ANDES MINING COMPANY.

An extraordinary general meeting of shareholders was held at the offices of the company, King-street, Cheapside, on Friday, Nov. 2, The Chairman of the company presiding.

The SECRETARY read the notice convening the meeting, and the minutes of the preceding one, which were confirmed.

The following is the directors' report:—

The accounts of the cost and product of the mine are appended to the directors' report; it will be seen by them that the profit of the mine in Marmato for the first five months amounted to the sum of 307*l.*, but that from that period to the end of the financial year there was a loss of 180*l.*

It will be in the remembrance of the shareholders that about July, 1876, a revolution occurred in the State in which this mine is situated against the Federal Government, this State forming one of the United States of Colombia. The immediate consequence of this revolution was the loss of many men employed at the mine; some joined the insurgents of their own accord, others were forced to take part or hid themselves away to avoid the same fate. The superintendent was enabled at first to make an arrangement with the revolutionary parties which then held power in the district by which some hands were allowed to return to work, but this only lasted for a short period, as by reason of reverses sustained the revolutionists about the end of August impressed all the men they could find, leaving the mine nearly denuded of miners, and thus it continued during the remainder of the year. Notwithstanding the loss thus incurred for want of miners, the accounts show upon the year's working a profit of 316*l.* 17s. 6d., which amount the directors recommend should be carried forward.

The directors are happy to state that the revolution is now quelled and peace restored, also that miners are returning; but the want of miners and labourers during the period that the revolution existed has had an effect not only of diminishing the supply for the mills, but also upon the general state of the mine, such as the want of reparation of the plant and renewal of the timbering and other necessary works underground. These works are now being proceeded with, but the effect of this neglect, it is to be feared, will be felt for some little time to come.

The directors are happy to state that the metalliferous character of the mine continues the same; that the reports of the superintendent and captain in this respect are encouraging, no doubt appearing to be entertained by them that the mine will be again equal to what it was prior to the revolution. This opinion appears to be confirmed by the monthly returns, for it will be observed that the profit was increasing, thus the profit for May, which was about 480*l.*, was doubled in July, and nearly trebled in August.

The CHAIRMAN said the directors would have called the shareholders together at an earlier date had they been in a position to lay the accounts for the fourth financial year before them, and to give them some idea of the prospects of the mine for the future. They were unable to make up the accounts earlier, because the product of the mine was lying at Medellin, it being unsafe, in consequence of the disturbed state of the country, to bring it to the coast for shipment. The ore had now been brought to England and sold, and thus the directors were enabled to lay the accounts before the shareholders. Besides the inconvenience of not being able to present the accounts earlier, the fact of the ore lying at Medellin had involved the company in some expense, because they had to find money for the monthly accounts, and had to obtain advances for which interest had to be paid. But when he told them that Messrs. Fruhling and Goschen advanced to the company nearly 10,000*l.*, and Messrs. Restrepo, the agents of the company abroad, lent nearly 700*l.*, the shareholders might take it that these firms were of opinion that this was not one of the visionary mines they heard so much of in the City of London, but that it was a solid and good undertaking. It might be said that the accounts which were now presented were satisfactory, and yet unsatisfactory—unsatisfactory because they did not show a sufficient profit to make a dividend, but while they did not admit of such a division, it would be seen, on referring to the accounts, that the returns of the first five months' working showed a large profit—the other seven months showing a loss as they were no doubt aware. The war broke out somewhere about July, and from that period losses must have inevitably occurred. It would be noticed that the profit, which in May amounted to 423*l.*, gradually increased, until in August it reached 1147*l.* Now, if the monthly accounts had shown sometimes a profit and sometimes a loss, it would have been supposed that there was some defect in the mines or falling off in the product or producing power of the mine; but this was not so—the profits had gone on increasing gradually until the time of the war. The miners were then taken away, and so the progress of the development of the mine was hindered, and the result was a loss month by month. He did not think that people could say that mining property alone was subject to these things, because property of all kinds and all descriptions feel the effects of war, and at the present time they were hearing from day to day that in Bulgaria homesteads were being burnt, ground ripped up, and great destruction was being carried on; and, therefore, whatever property one might invest in was at times subject to these wars and perils of war. The loss, which all continued to a certain extent, must not be taken entirely as having no benefit to the company, because during the time of the war explorations had been made, and there had been a new discovery, or rather a discovery of an old mine—the San Antonio. The captain had found some workings, the minerals raised from which assayed 250 ozs. of silver to the ton. It was sometimes better, and sometimes worse, but, on the whole, it was reported to be a very good lode. No doubt the war had had an injurious effect upon the company, inasmuch as the works had got into a state of dilapidation. By not being able to make the stitch in time they required nine stitches to make up for the loss sustained. They had also been visited with a drought, and water had been very scarce. Although peace was now proclaimed it was utterly impossible to divide the loss sustained by the war and drought. The manager writes—"The drought still continues, reducing the supplies of water more and more."

A SHAREHOLDER: What is the date of that letter?——The CHAIRMAN: It came a few days ago, so that they would see that it was a great misfortune that the company was short of water, because it might be said that hitherto they had had their water power entirely without cost. At the same time the manager wrote—"A large pile of mineral is ready for the mills," and when Nature recouped itself, which was more likely to do than the war of kings, the mine was likely to right itself. At the present time they were getting back their miners, and they were getting ready for the approaching wet season. On Sept. 4 the superintendent wrote—"I can only repeat what I said in my last, that until there is rain there can be no improvement, and I feel I shall have to report one more bad month"—that would be the September month, but at the same time rain was reported to have fallen within the State, and near to the mines. They might, therefore, hope that at all events in September they might have had rain, and that the fears of the superintendent might not be realised. He (the Chairman) could only say that he saw no reason for despending, as they were suffering from such a drought as had not occurred for 20 years. There was no reason to doubt the value of the mine—indeed, he might say that he feels very sanguine of great results for its development. Summing the matter up it amounted to this—Up to August they had very good profits, which if they had continued would have given very good dividends. Then the war occurred, which, of course, could not have been foreseen, and then the drought had continued up to the latest advices from the mine. But the war having now ended, he thought from the accounts received from the superintendent that with the return of the water) they might look again to have very good returns. He would be happy to answer any questions. Mr. Brandon was also present, and would be very happy to give the shareholders any particulars they might desire relative to the mine.

A SHAREHOLDER asked whether any idea could be given of the loss sustained in May, June, and July of the present year?——The CHAIRMAN said the losses in those months had been 570*l.* in May, 63*l.* in June, and 370*l.* in July, but he might tell them that the superintendent had spent $3000 in replacing various things, and that had been charged against the current accounts. Last year the five months yielded a profit, and the seven months a loss. The first five months of this year had yielded a loss; perhaps the other seven would give a profit, in which case there would possibly be a dividend. In another advice the superintendent (writing in July said—"I can positively say that had there been the usual supply of water good profits would have been secured."

A SHAREHOLDER supposed that as the war had terminated some time since the evil effects had now gone.——Mr. BRANDON replied that a good many of the men had not come back, although the war was at an end. Unfortunately the revolution had commenced just near the mine, and the miners employed by this company were the first men taken.

A SHAREHOLDER asked if there was generally a fair supply of water at the mine? Mr. BRANDON, in reply, said sometimes they had a little too much water, and sometimes not enough.——The SHAREHOLDER asked whether there was any means of damming the water?——Mr. BRANDON replied that they had to bring the water from a distance of three miles. He was now trying to cut through one of the mountains so as to carry the water through instead of round it, and he hoped in that work to cut three or four very good lodes of gold and silver. The hill through which he was cutting was known to be one of the richest hills ever worked by the Spaniards. By driving a level right through he hoped to come upon something worth cutting.

The SHAREHOLDER asked what would probably be the length of this cutting? Mr. BRANDON said he could not tell, but it would be right through the hill. He hoped to cut a lode that he had seen at surface. There was a silver formation and a gold formation in this hill, which was rather a rare occurrence. The gold formation was so rich when worked a few years ago that the men carried the ore in bags down to the mills, and they were obliged to have a guard on all the men and boys who carried it, to see that they did not pocket any of it. They could only get through this hill at the rate of about 1 fm. a week, and sometimes not even that—only 4 ft. or so. To give the shareholders an idea of the power that had been taken from them by the drought, he might state that out of 100 stamp heads only 30 were now moving, and those very slowly. There was another set of stamps, of which they had scarcely a third part going.

The report and accounts were then unanimously adopted.

The directors and auditors who retired by rotation were re-elected, and the proceedings terminated with a vote of thanks to the Chairman.

SOUTH CROFTY.—At the three-monthly meeting on Tuesday (Mr. Lean, the purser, in the chair) the adventurers were congratulated upon the improved price of tin. All costs were charged up to August. The costs during the past quarter, including the extras for new boiler and boring machine, has amounted to 3451*l.* 15s. 6d., and the credits to 2466*l.* 17s. 11d., showing a loss on the three months' working of 984*l.* 17s. 7d., and a total debit balance of 1917*l.* 14s. 10d. The drop in the copper standards had deprived them of nearly 300*l.* in their copper, and their arsenic realised only 164*l.* 6s. 5d., the price per ton being lower than anything they had ever before received. Capt. Josiah Thomas said that looking to the account of the next three months he was inclined to anticipate that they would very nearly pay their way, and if the price of tin should further improve it would help them considerably. Copper was lower at the present time than it had been for the last fifty years. They had a very large lode opening in the south lode, to which reference was made in the report, from 12 to 18 ft. wide, and it would turn out a large quantity of stuff. In reply to shareholders he further stated that the boring machine was going on remarkably well, and doing more than three times the amount of hand labour. They were now driving 9 ft. a week comfortably, whereas formerly they only drove 10 ft. a month with eight men, and he thought the cost was rather less than hand labour. Considering the large amount of dead work being done, and the low price of metals, it was suggested that a 10s. call would be insufficient, and after some discussion a call of 1*l.* per share was made.

[For remainder of Meetings, see to-day's Journal.]

FOREIGN MINES.

ST. JOHN DEL REY MINING COMPANY (Limited).—Advices received Nov. 1, 1877, ex Minho (s), dated Morro Velho:—

GOLD EXTRACTED TO DATE.—The produce for the second division of September—a period of eleven days—has amounted to 15,401·8 oits., or 1775·5 ozs. troy. It has been derived as follows:—

	Oits.		Tons.	Oits. per ton.
From general mineral	6,384·5	from	902 =	7·078
Mineral freed from killas	6,599·0	,,	563 =	11·721
Cotesworth mineral	1,136·0	,,	159 =	7·144
Re-treatment, &c.	1,282·3	,,	— =	0·242
Total	15,401·8	,,	1624 =	9·482

The foregoing produce is favourable—the amount treated less by 143 tons, compared with the corresponding division for the month of August. With a view to a higher and more perfect extraction of the gold contents, a lower rate of stamping has been tried; the result has been so far satisfactory both as to the standard yield and loss on process, the above return being the highest for some time past.

The water supply is ample for all requirements—rainfall for the month, 2·21 in.

Advices received Nov. 14, ex Tagus (s), dated Morro Velho, Oct. 18:—

GENERAL OPERATIONS.—As previously advised in the divisional returns, a large amount of work has been done during the month. The foundation of the pumping wheel has received important and permanent repairs. Long sections of launders have been renewed on the main water-course as well as other miscellaneous though pressing work.

The produce, though under that for August, is as much as could be expected, the loss of one day's stamping duty, due to the entire suspension of the mills, being equal to 1342 oits., and the amount of mineral treated less by 462 tons, or 3696 oits. The standard yield shows no falling off, which is favourable, considering the withdrawal of the force from the sump and most productive sections during a period of three days.

In the mine fair duty has been done, the quantity of mineral being fairly equal to the previous return, though with a smaller output, consequent on the stoppage. The pitwork has been thoroughly examined and repaired, and a third and last plunger section placed, all of which are working satisfactorily, and with greater efficiency.

REDUCTION DEPARTMENT.—There have been several minor interruptions during the month, the greater part of the machinery so long in use requiring constant repair. Besides the reported stoppage there was a loss of 15 hours for repairs to the Addison and Cotesworth stamps, or a total loss of 2·04 days compared to August—the average of the working duty of the stamps being as follows:—Average number of heads working 30 days, 128·73; average number of days working with 135 heads, 28·61. At the Praia a fair average amount of sand has been re treated, and daily experiments made towards a better recovery of the gold contents.

GOLD PRODUCE FOR THE MONTH OF SEPTEMBER.—The produce extracted during the above period amounts to 40,255·3 oits., or 4640·7 ozs. troy. It has been derived as follows:—

	Oits.		Tons.	Oits. per ton.
From general mineral	17,079·0	from	2557 =	6·679
Mineral freed from killas	17,053·1	,,	1587 =	10·745
Cotesworth mineral	2,650·9	,,	397 =	6 677
	36,783·0	,,	4541 =	8·100
Re-treatment	3472·3	,,	— =	·764
Total	40,255·3	,,	4541 =	8·864

Equal 4640·7 ozs. troy, or 1·02 oz. troy per ton.

COST AND PROFIT.

The produce for September being	40,255·3 oits.		
Deduct loss melting into bars ...	300·7 ,,		
	39,954·6, at 7s. 9d. per oit. —	£15,482	8 2
Cost		7,442	8 3
Profit for the month		£ 8,059	19 11

The exchange is the same as last month; the cost less by 236*l.*

MINE DEPARTMENT.

Mineral delivered on spalling floors	5918 wagons.
Mineral quarried per borer per diem	1·85 wagon.
Average number of natives daily	201·24
Average number of borers daily	127·84

SUMP AND STOPE, 278 A.—The sinking duty (3 ft. 9 in.) has been small, the greater part of the output being obtained from the south side of the excavation, which has yielded the average quantity of pure pyritic contents. The result has been an increased width of stoping area at this point. The pitwork has also been removed to the north side, leaving its former site available for extraction. The general appearance of the lode at both points is favourable, and without change since last reported.

LEVEL ABOVE SUMP AND STOPE SECTIONS, 258 D AND 278 B.—The proportion of pure mineral to mixed lode with killas has slightly improved. The average of the high grade ore being 8½ ft., or in all 14 ft. 6 in. of fair mineral-bearing portions. The intrusive body of killas shows no further increase. A fair advance has been made considering the hardness of the forebreast and the force employed, as will be seen by the list of measurements previously sent forward.

The sections, as above marked, embrace one large stope, its position with the sump admitting of a large extraction. In the bottom part of it its total width is 34 ft., 20 feet of which is pure mineral. The indications at this point are such as to warrant the expectation of a continuous supply of ore.

EASTERN DRIVING UNDER ROOF AND STOPE, 236 B.—The extent of mineral-bearing ground continues limited, the advance for the month being small, the force having been drafted to other sections. From the stope the yield and quality has been favourable, though difficult of extraction. The general appearance of the lode, as previously reported, is promising and of large capacity.

STOPES WEST FROM SUMP, 257 C AND D.—The extraction has been chiefly confined to 257 C. The width of the excavation is 35 ft., with 20 feet of rich compact pyritic mineral and gold bearing quartz on the south wall. The upper part of the stope, principally disordered lode and killas, is temporarily under suspension.

256 B.—A fair advance has been made both in extent and depth of this stope; the general body raised is of low quality, with no prospect of improvement until a more westerly extension is effected, when there is reason to expect the continuation of the improved ground in 255 B being met with.

WESTERN SECTIONS 235 CD AND 255 B.—There has been a slight increase in the stoping area—a rich pyritic body of mineral has been met with on the south wall and extending through the above-named sections; average width 21 feet. The mineral is compact and free from either quartz or killas. The so far limited extent of the explorations in this direction precludes any positive opinion being given as to its permanency, but it is encouraging to note that the indications there met with are highly satisfactory. There is no change to note in the forebreast of the western advance level; the lode, though much intermixed with black quartz, is strong, and to all appearance capable of greater extension. In view of the southerly bearing of the mineral body above referred to the direction of the level will be correspondingly altered.

GOLD EXTRACTED TO DATE.—The produce for the first division of October, being a period of eight days, has amounted to 9186 oits., or 1095 ozs. troy. It has been derived as follows:—

	Oits.		Tons.	Oits. per ton.
General mineral	3681·8	from	676 =	5·446
Mineral freed from killas	4012·1	,,	413 =	9·714
Cotesworth mineral	526·0	,,	86 =	6·116
	8,219 9	,,	1175 =	6·995
Re treatment	946·2	,,	— =	·821
Total	9,186·1	,,	1175 =	7·816

Equal 1059·0076 ozs. troy, or ·9012 ozs. troy.

The above low produce will have been anticipated. During the period of seven days a very small proportion of rich mineral matter was obtainable from the sump and adjoining sections, the greater part treated during the division being from the intermediate and extreme western stopes.

REDUCTION DEPARTMENT.—Delays are still being experienced, the pinion of the Cotesworth stamps having given way. At the Praia 12 additional heads (Illingworth) were put to work on the 16th inst., and, owing to the large reserve of general mineral with killas, they will be kept apart for the treatment of same. Heavy rains have set in, and the supply of water passing over the establishment is more than sufficient for all requirements.

MINE.—The returns for the first fortnight of September, embracing a period of 14 working days, are as follows:—

Mineral sent to spalling floors	3470 wagons.
,, quarried per borer per diem	1·98 ,,
Average attendance of natives daily	185·64
Average attendance of borers daily	125·00

GENERAL REMARKS.—The unwatering of the sump and eastern sections was accomplished on the evening of the 7th. There is no change generally to note in any of the mine sections. The output and average per ton show no falling off.

B SHAFT.—There has been great delay in the completion of the necessary protection works preparatory to sinking. For the security of the force engaged large pieces of timber have been placed across the shaft and strongly covered. To effectually secure these several deep hitches on both sides of the shaft have been made, the nature of the work proving both slow and tedious, owing to the interruptions in consequence of the B kibble passing to and fro. Sinking will be commenced this week.

The gold troop was dispatched on the 13th inst., taking a total remittance of 80,042·2 oits., equal to 9427 5 ozs. troy, for shipment per Tagus.

The following telegrams have been received:—

On Oct. 18—"Produce eight days (first division of October), 9000 oits.; yield, 7·8 oits. per ton. All going on well."

On Oct. 24—"Profit for the month (September), 8000*l.*"

On Oct. 30—"Produce eleven days (second division of October), 13,000 oits.; yield, 8·7 oits. per ton."

On Nov. 13.—"Produce for month (October), 35,000 oits.=13,562*l.*; yield, 7·9 oits. per ton."

DON PEDRO NORTH DEL REY.—Report for September: Produce from 1760·27 tons, dry weight, 4006 oits.=1702*l.* 11s.; cost, including all general expenses, also cost of labour and materials, amounting to 1894*l.* 10s. 7d., for erection of permanent pumping machinery, 2405*l.* 9s. 8d. Capt. Vivian (Oct. 18) reports: Produce weighed to date, 1908 oits. The following telegrams referring to later dates than the above report have been received:—On Oct. 26, dated Rio, Oct. 25: "New incline tramroad finished." On Oct. 29, dated Rio, Oct. 27: "Resumed drawing ores from bottom of mine." On Nov. 13, dated Rio, Nov. 12: "Produce for the month (October) 4200 oits."

RICHMOND CONSOLIDATED.—Telegram from the mine at Eureka, Nevada: Week's run, $75,000, from 1000 tons of ore (three furnaces). Week's produce of refinery, $30,000. Everything running well.

— R. Rickard, Oct. 23: The ore in the stope in back of the 400 level is still developing well, it now shows a large body of good ore. The No. 2 stope is opening out well; we have put a rise up in ore 80 ft. high, and drifted 80 ft. on the ore at the top of the rise. The rise in back of the 200 is in very good ore. The 500 drift is in limestone without any ore. The 600 on quartzite is without change. The 800 drift on quartzite is looking very promising, it shows occasional stones of iron ore. The 900 on fissure is without change. The furnaces are doing very well, and producing a large amount of bullion. The third stone furnace is now working on Jackson ore and drosses from calcining pans.

JAVALI.—The manager (Oct. 6) reports that the mill worked 25 days, crushing 2100 tons of quartz, from which 614½ ozs. of gold were obtained, valued at 1690*l.* The expenditure, including 70*l.* on capital account, had been 906*l.* The manager states that the entire works are in excellent condition, and that he hopes to forward a better remittance next month. The results obtained by the tailing mill are at present disappointing.

PANULCILLO (Copper).—Panulcillo Alto, Sept. 30: Our production for the month amounts to over 24,000 quintals metrico, at 5½ per cent. Holidays of Sept. 18 prevented any extraction for last week.

HUNTER CONSOLIDATED.—Telegram: The furnace has run four days, producing $4000.

SIERRA BUTTES (Gold).—Result of the working at the Plumas Eureka Mine for October: Total receipts, $41,169; total California expenses, including cost of mining, milling, erection of new buildings, &c., $2 ,289. The mills at the Sierra Buttes Mine were idle throughout October, owing to the failure of the water supply, but it is stated by telegraph that 24 stamps were at work yesterday, the 13th inst.

CHONTALES CONSOLIDATED.—W. White, Oct. 2: Total quantity of quartz treated during the past month is 1130 tons, which produced 359 ozs. of gold, or an average of 6 dwts. per ton; value of the gold, 932*l.*; total cost for September, 486*l.*, leaving a profit of 446*l.* The above cost includes the sum of 72*l.* expended on machinery and tramroads.—Estrella Mine: I am now clearing and repairing the main level as fast as possible, after which the level inside on the lode and the tramroad will want repairing, and will take about two months more before this mine will be in proper working order.—San Sebastian Mine: Drove a shallow level during the month 9 varas, stopes from the high stopes 338 cubic varas, raised during the month from the drivings and stopings in this mine 780 tons of quartz, which yielded on an average 6 dwts. to the ton. We have also passed through the stonebreakers during the month 350 tons, which produced on an average 6 dwts. to the ton. We have repaired the main level, and the mine is in regular working order. We have driven the main level during the past month 7 varas; the lode here is a little harder than usual, but I shall now have this end pushed on with all speed, as I notice that the old workings met with in the new rise and shallow level above inclined towards the end, which is evidence that the natives worked down after a shoot of gold dipping in that direction; and according to the run of the old workings, and the position of the end in the main level, we should have now about 25 metres more to drive before we reach this shoot. I feel much encouraged for the other mines by what we have already done in San Sebastian, as no one knew or could tell me when I came here that I should be able to send home 50 ozs. of gold per month from this mine and I now take it for granted that no one can tell me the real value of the other mines, but when they are in full operation I think we may fairly calculate to do as well in each and every one of the other mines as at San Sabastian, as I do not think we have raised anything above what would be the average quartz if the other mines were at work, for the good places would then make up for the bad.

I.X.L. (Gold and Silver).—Mr. Lewis Chalmers writes, Oct. 22: We have still water enough to retard progress in sinking. When in the shaft yesterday there was issuing from the south-east corner of the shaft a stream of water in one place 2 in. in diameter. There is no difficulty in handling it, but it makes sinking slow. The streaks referred to by the foreman as coming in in the bottom of the shaft are gypsum, not quartz. There is a cross ledge above the shaft which we may be nearing.—Foreman's report: "The engine-shaft is now down 3½ ft. below the 300 station; 7 ft. sunk this week. The water is still heavy in the said shaft, and it is taking two men each shift nearly all their time to handle it. It also takes considerable steam to run the engine and pump. It takes 4¼ cords of wood per 24 hours. The shaft is looking favourable on bottom; it is full of small streaks of quartz. Everything in and about the mine is running and working well."

CAPE COPPER.—Capt. Tonkin, Sept. 30: Ookiep: The 92 from bottom of main shaft is being vigorously pushed forward towards the bunch of ore in the eastern part of the mine. The ground in this driving is massive quartz, which lets out water freely. The new shaft has not been deepened during the month, as we considered it desirable to carry out levels on the branch of copper ore discovered in the sinking. The drivings are yielding some very rich ore, and the size of the joint in the present ends of the levels is about the same as in bottom of the shaft. In extending the levels we find the vein taking a direction more east and west than we anticipated while sinking, but I do not consider that to be a bad indication. We have again started to work in bottom of the shaft, and we intend, if possible, to push forward the levels at the same time. The 80, south-east from No. 19 winze, has greatly improved during the month, being at present worth fully 5 tons of good quality ore per fathom. This driving is situated in the eastern extremity of the bottom workings, therefore it is a very important point. In the 80 south, from No. 19 winze, we have intersected a bunch of very rich copper ore. It was first discovered in the back of the driving, and it dips south, so that we have reason to hope that it will soon reach the bottom of the level. The 80 east has not undergone any change to notice since last report; the small branch of rich ore (before mentioned) still continues, but it does not increase in width. The 68 east, from No. 13 winze, is not opening out any ground that can be stoped away at a profit, but the cross cut north from the side of the same is looking well, worth 7 tons of ore per fathom. In the 58 east, from No. 20 winze, we sometimes find good stones of ore, but scarcely enough to value. The 48 east, from No. 14 winze, is in hard and poor ground. The stopes have yielded well during the month, and our work, both underground and on the surface, has been carried on regularly.

SPECTAKEL.—Capts. Tonkin and Ninnis, Sept. 24: The winze below the 46 still yields a small quantity of high percentage copper ore. We intend shortly to drive out a level from bottom of the sinking to prove the ground. The 36 has been extended some distance east of the flookan course, but in that direction the ground is evidently quite unproductive. We have now started to drive north on the flookan course, as there is a little ore showing in this place, but altogether it does not look very promising. In shaft below the old workings the ground has not undergone any change to notice. In the 27 south, towards Kelly's shaft, the ground is somewhat easier for driving, and it shows a few spots of copper ore, but nothing to value. The prospects of the mine continue very gloomy, and a few more months will exhaust the trials.

TRIAL MINES.—Capt. Tonkin, Capt. Lanksbury, Sept. 15: The 20 west at Karolusberg is in poor and unpromising-looking ground, therefore we have suspended the driving, and started a cross cut south near the shaft. The cross-cut north has not changed since last report. The 28 south east, from the bottom of shaft at Nababeep, is not at present yielding much copper ore. The productive ground that we passed through is about 8 ft. wide, and we intend shortly to open out a stope at this point. In the 28 north east the ground is unproductive. The 17 east, from old shaft, continues to yield a little copper ore, and the ground is of the same nature as when last reported. At Narrap the ground in the driving became so unkindly that we suspended it, and started another trial at the same depth. At the trial mine, west of Ookiep, the level from bottom of the shaft produced some very good copper ore, but the most productive ground is in the lower part of the driving, consequently we have decided to deepen the shaft.

Returns for September: Ookiep, 950 tons of 33 per cent.; Spectakel, 8 tons of 20 per cent.—Bills of Lading Received: 550 tons of ore per Ocean King, 550 tons per Prince Alfred, 144 tons per Edinburgh Castle (s.), and 480 tons per Spartan.—Arrivals at Port Nolloth: The Cambala and Corsair.—Arrivals at Swansea: The Lynwood, Raven, Pathfinder, Ocean King, and Florence.

PESTARENA.—Nov. 8: District Val Toppa: Western Part of Great Quartz Lode—Zero Level: In the end south of third cross-cut westward the lode is yielding 3 tons per fathom, low quality. The stopes in the back behind this end are producing 3 tons of ore per fathom, worth 10 dwts. per ton.—Intermediate Level below Zero: In the end south the lode is producing stones of ore; in the end north 1 ton per fathom. The lode in the rise behind this end is small at present, and rising is suspended.—No. 1 Level: In the end south the lode is yielding about 6 tons per fathom, worth 8 dwts. per ton. This end is suspended for the present, or until a new shoot from the Intermediate level down to No. 1 level has been completed. The stopes in the back of this level are yielding 3 tons of ore per fathom, worth 8 dwts. per ton. In the end south in No. 2 level the lode is small, with stones of ore.—Great Quartz Lode: In north end of ground, under No. 2 level, lode about 15 ft. wide, yielding 6 dwts. stuff. During the present month we intend sinking from this drive to communicate to No. 3 level for a pass. The stope south of winze, under No. 2 level, is producing 10 tons per fathom, worth 7 dwts. per ton. The No. 1 stope in the back of the Intermediate level south is yielding 14 tons per fathom, worth 7 dwts. per ton, and the No. 2 stopes in this same back are yielding 8 tons per fathom, worth 10 dwts. per ton. The rise in No. 3 level is producing 6 tons per fathom, worth about 5 dwts. per ton.—Flat and New Lodes: In the end south in Zero level, on the counter branch, the lode is producing occasional stones of ore.—No. 2 Level: Rise south of fourth cross-cut, on the flat lode, is producing 1 ton per fathom, worth 12 dwts. The stopes in the bottom of No. 2 level, on the turn of the flat lode, south of the fourth cross-cut, are producing about 9 tons per fathom, worth 10 dwts. per ton. In this level south of first cross-cut, on the flat lode, the lode is 3 ft. wide, composed of quartz of rather low quality. In the Intermediate drive under No. 2 level, and north of second cross-cut, on the turn of flat lode, the lode is producing 5 tons per fathom, worth 9 dwts. per ton.

No. 3 Level: In the end north of cross-cut, on the new lode, the lode is about 1 ft. wide, chiefly quartz of low quality. In the end south of cross-cut the lode is small, and driving is suspended for the present. During the present month the stopes in back of this level will be resumed, where the lode yields about 9 tons per fathom, worth 8 dwts. per ton.—Lode and Branches East of New Lode: The end north of the fourth cross-cut, in No. 2 level, is poor, and has been suspended. For the past few days we have had a considerable increase of water in the 4th cross-cut eastward, coming from the breast of cross-cut. The cross-cut westward in No. 5 level is being continued.—Surface: Good progress is being made on the barracks at mid-station of the new wire-rope line, and we hope to complete it next week, after which further trials of this wire incline will be made.

District Pestarena: The 100 end north is yielding at present 5 tons of ore per fathom, of low quality. A small mill trial showed 2 dwts. per ton. The 100 end

south yields 1¼ ton per fathom, worth as per small mill trial 6 dwts. 10 grs. per ton. The 90 end north is yielding 5 tons per fathom, worth as per small mill trial 4dwts. 4 grs. per ton. The stopes in back of this level are yielding about 7 tons per fathom, worth 12 dwts. per ton. The 90 end south is yielding at present 2 tons per fathom, worth 2 ozs. 1 dwt. 21 grs. per ton. The stopes in back of this level yield 9 tons per fathom, worth 1 oz. 16 dwts. 10 grs. per ton. In the 80 end north the lode is small. The stopes in the back, behind this end, are yielding 2½ tons per fathom, worth as per mill trial 4 dwts. 4 grs. per ton. The 65 cross-cut continues to traverse strings of quartz, and water is still issuing. The end south of this cross-cut, on No. 2 lode, is yielding ½ ton per fathom, worth as per small mill trial 2 dwts. per ton. In the 55 end north the lode is small. The stopes in back of this level are yielding 8 tons per fathom, worth 1 oz. 1 dwt. 12 grs. per ton.—**Acquavite Department**: The stopes in back of the 55 are yielding 5 tons per fm., worth 17 dwts. 2 grs. per ton. The stopes in back of the 23 are yielding 3½ tons per fathom, worth 10 dwts. 15 grs. per ton.—**Surface**: Fair progress is being made in fixing the mill shafting; the main driving-wheels and central shaft for six mills are in place, and this week we shall commence to put up the cross intermediate gear (shafting and wheels). This work is being pushed on as fast as possible. All machinery is working satisfactorily, both underground and on surface.

LUSITANIAN.—Nov. 6: Palhal: The lode in Taylor's engine-shaft, below the 200, has ore scattered through it. In cutting the 200 plat the lode is worth near 2 tons per fathom. In the 50 cross-cut north of Perez' shaft the ground is composed of hard fine gneiss; so far no more lode or branch. The lode in winze No. 108 below the 150, west of slide on Basto's lode, is very small and unproductive. In winze No. 107 below the 180, on Basto's lode (south part), the lode is 2½ ft. wide—of quartz. Winze No. 109 below the 190, west of Taylor's, on Basto's lode, is holed to rise No. 109 above the 200; we fear the stoping ground is little.—**Levels on Basto's Lode**: The lode in the 200, west of Taylor's, is worth ½ ton per fathom; the lode in the 190, west of Taylor's, is worth 1 ton per fathom. In the 180, west of Taylor's, on north part, the lode is narrow, but has small stones of ore in it. In the 160, west of Taylor's, west of slide, the lode is small, but the wall is regular. The lode in the 150, west of Taylor's west of slide, is 1¼ ft. wide, composed of quartz, and at times spots of ore. In the 90, east of River shaft, the lode is 3 in. wide, of flookan, the country is schistose. The lode in the 70, east of River shaft, is 6 in. wide, of flookan, and at times small stones of lead; the country is schistose. In the 50, east of River shaft, the lode is 2 ft. wide, composed of quartz and stones of ore.—**Carvalhal**: In driving the north deep adit south-west on the slide lode, there is a small flookan in the end, which has a good wall. The lode in the top adit level south, or valley lode, contains stones with faces of lead and others spotted through, but not enough to value.

For remainder of Foreign Mines, see to-day's Journal.]

THE SCOTCH MINING SHARE MARKET—WEEKLY REPORT AND LIST OF PRICES.

During the past week the market has been quiet on account of the settlement intervening, but purchases for the next settlement (Nov. 25) are latterly being more actively entered into. There is no doubt, owing to the generally more hopeful view of trade improving, more confidence among investors, and the greatest profit must accrue to those whose foresight enables them to take advantage of the indications of the recovery while prices are still in the balance. As regards new companies, however, it will be as well to avoid them for some time.

In shares of iron and coal concerns, both classes of Glasgow Port Washington are wanted at 10s. advance, while Arniston have fallen 12s. 6d., and Monkland (pref.) 2s. 6d. Scottish Australian shares are 2s. 6d. lower, and the meeting is to be held on the 23rd instant. Benhars have improved 18s. 6d., and the new shares 16s. 6d., owing to the sales lately pressed having been completed, and succeeded by a good demand. Bilbao are at 26. Bolckow, Vaughan, A, 53¾; ditto, B, 33½; ditto (pref.), 20l. 1s. 3d.; ditto (100l. paid), 107½. Chapel House, 50s. to 60s.; Chatterley, 29s. dis.; Chillington, 70s.; John Bagnall and Sons, 65s.; Pelsall, 11¼ dis.; Sandwell Park, 18¾; Scottish Australian, 35s.; ditto (new), 7s. 6d. to 12s. 6d.; Sheepbridge, 11½ dis.; Spon Lane, 6½ dis.; Staveley, A, 25 prem.; Tredegar, A, 10 dis.

In shares of foreign copper concerns Tharsis are 5s. higher; these shares are well held and scarce, so would rise very quick with any improvement in copper. There are reductions of 70s. on Rio Tinto 5 per cents., and 6d. on Canadian. Hultafall are at 5; Panulcilio, 30s. to 35s.; New Quebrada, 45s.; Rio Tinto 5 per cent., 52¾; Yorke Peninsula (ordinary), 5s. to 7s. 6d.

Shares of home mines have been very quiet. Glasgow Caradons are reduced 6d., at 18s. 6d. to 19s. 6d.; and the new shares also 2s. 6d. lower, at 12s. 6d. to 15s. Bampfylde are 5s.; Cambrian, 40s.; Combmartin, 4s.; D'Eresby, 15s.; Dolcoath, 38s.; Derwent, 40s.; East Chiverton, 30s.; East Van, 6s. 6d.; Glenroy, 17s. 6d.; Great Laxey, 22; Killifreth, 10s.; Leadhills, 95s. to 97s. 6d.; Medlyn Moor, 3s.; North Laxey, 9s. to 11s.; Parys Mountain, 12s.; Pateley Bridge, 65s.; Penstruthal, 5s. to 7s. 6d.; Roman Gravels, 7¾; Rookhope, 22s.; Tankerville, 5½; South Condurrow, 9½ to 9¾; Van Consols, 10s.; West Assheton, 5s. to 15s.; West Basset, 40s.; West Frances, 5½; West Wye Valley, 70s.; Wheal Agar, 80s.; Wheal Grenville, 67s. 6d.; Wheal Kitty (St. Agnes), 47s. 6d.

In shares of gold and silver mines Richmonds are now quoted ex div., and are rather higher, though nearly 20s. under the top price of the week; the run this week is 875,000. The returns of Chontales and Juvali show considerable improvement. Antioquia are at 11s.; Chicago, 47s. 6d.; Eberhardt, 7¼; Emma, 1s. 3d.; Exchequer, 5s. to 7s. 6d.; Flagstaff, 48s. 9d.; Frontino, 57s. 6d.; I X L., 5s to 7s. 6d.; Last Chance, 12s. 6d.; Pestarena United, 5s.; Santa Barbara, 21s.; South Aurora, 6s. to 7s.

Shares of oil companies have inclined upwards. Young's Paraffin have advanced 7s. 6d., Uphall 8s. 3d., and Dalmeny 2s. 6d. Oakbank are 4s. 6d. lower, and ditto (new) 1s. 9d. The letters of allotment of the new company—the Broxburn—have been issued. Price's Candle are at 11½. Runcorn Soap and Alkali, 6¼ dis. Shares of miscellaneous companies are still neglected. Phospho-Guano are 2s. 6d. lower at 10¾ to 10¾. Birmingham Wagon are at 19¾. Birmingham and Midland Counties Val de Travers, 25s. Chemical companies are quoted:—Langdale, 83s. 9d.; Lawe's, 7l. 1s. 3d.; and Newcastle, 37s. 6d.

The following were the rates of continuation current for continuing transactions at the settlement, Nov. 14:—Contangoes: 2d. on Benhar Coal; 1d. on Canadian Copper; 1d. on Glasgow Caradon; 1d. on Port Washington; 2d. on Marbella; 1d. on Monkland Iron; 2d. on Oakbank Oil; 9d. on South Condurrow; 10¾., 10d. on Uphall; 9d., 6d. on Young's Paraffin.—Backwardations: 3d. on Omoa and Cleland.—Even: 6d., 1s., 1s. 3d. on Richmond; 1s., 6d. on Tharsis.—Even, Huntington.

Subjoined are this week's quotations, &c., of mining and metal shares quoted on the Scotch Stock Exchanges:—

Capital. Per share.	Paid up.	Dividends. Rate per cent. per annum. Previous.	Last.	Description of shares.	Last price
				COAL, IRON, STEEL.	
£10	£8	£ 8½	£ 8½	Arniston Coal (Limited)	7¾
10	10	6	6	Benhar Coal (Limited)	7
10	10	6	6	Ditto	7¾
100	50	13s9d†	14s6d†	Bolckow, Vaughan, and Co. (Lim.) A.	53¾
10	10	10	10	Cairntable Gas Coal (Limited)	10¼
10	10	nil	—	Chillington Iron (Limited)	70s.
32	29	nil	nil	Ebbw Vale Steel, Iron, and Coal (Lim.)	5
10	6	nil	nil	Fife Coal (Limited)	7½.
10	10	nil	nil	Glasgow Port Washington Iron & Coal (L)	40s.
10	10	—	—	Ditto Prepaid	40s.
10	1½	—	—	Lochore and Capledrae (Limited)	50s.
10	10	nil	3	Marbella Iron Ore (Limited)	76s.
10	10	nil	nil	Monkland Iron and Coal (Limited)	45s.
10	10	5	4	Ditto Guaranteed Preference	75s.
100	100	nil	nil	Nant-y-Glo & Blaina Ironworks pref (L)	10½
6	6	nil	nil	Omoa and Cleland Iron & Coal (L & Rel.)	29s. 6d.
1	1	17½	15	Scottish Australian Mining (Limited)	35s.
1	8s.	17½	15	Ditto New	8s. 9d.
Stock	100	nil	nil	Shotts Iron	91
				COPPER, SULPHUR, TIN.	
4	4	—	—	Canadian Copper and Sulphur (Lim.)	2s. 6d.
10	7	40	40	Cape Copper (Limited)	57s.
1	1	15	7½	Glasgow Caradon Copper Mining (Lim.)	18s. 6d.
1	18s.	15	7½	Ditto New	12s. 6d.
10	9¾	nil	nil	Huntington Copper and Sulphur (Lim.)	30s.
25s.	20s.	—	—	Kapunda Mining (Limited)	6d.
4	4	—	—	Panulcilo Copper (Limited)	25s
10	10	6	6	Rio Tinto (Limited)	72s. 6d.
20	20	7	7	Ditto, 7 per cent. Mortgage Bonds	14
100	100	5	5	Do., 5 per cent. Mor. Deb. (Sp. Con. Bds.)	85
10	10	nil	nil	Russia Copper (Limited)	40s.
10	10	22½	20	Tharsis Copper and Sulphur (Limited)	21 3s 9d
10	7	22½	20	Ditto New	14¾
	1	—	—	Yorke Peninsula Mining (Limited)	5s.
	1	—	—	Ditto, 15 per cent. Guaranteed Pref.	17s. 6d.
				GOLD, SILVER.	
	1	—	—	Australian Mines Investment (Limited)	8s. 9d.
5	5	7s. 6d†	7s. 6d†	Richmond Mining (Limited)	8½
				OIL.	
10	7	6	6	Dalmeny Oil (Limited)	81½
1	1	7½	25	Oakbank Oil (Limited)	40s. 6d.
1	8s.	—	25	Ditto	10s. 3d.
10	10	2½	7½	Uphall Mineral Oil (Limited) "A"	£1 18s. 9
10	10	—	—	Ditto "B" Deferred	10
10	10	—	—	West Calder Oil (Limited)	75s.
10	8½	9	17½	Young's Paraffin Light & Mineral Oil (L	14l. 11s. 3
				MISCELLANEOUS.	
50	25	5	6	London and Glasgow Engineering & Iron Shipbuilding (Limited)	25½
20	14½	—	—	Peruvian Nitrate (Limited)	10
7	7	20	10†	Phospho Guano (Limited)	10¾
10	10	6	6	Scottish Wagon (Limited)	11¾
10	4	6	6	Ditto New	87s. 6d

† Interim. ‖ Per share.

Last day for this account, Nov. 26; settling day, Nov. 29.

NOTE.—The above lists of mines and auxiliary associations are as full as can be ascertained, Scotch companies only being inserted, or those in which Scotch investors are interested. In the event of any being omitted, and parties desiring a quotation for them and such information as can be ascertained from time to time to be inserted in these lists, they will be good enough to communicate the name of the company, with any other particulars as full as possible.

J. GRANT MACLEAN, Stock and Share Broker.

Post Office Buildings, Stirling, Nov. 15.

SCOTTISH AUSTRALIAN MINING COMPANY.—The report for the half-year ending June shows that the balance of profit for that period, inclusive of the amount brought forward, was 18,224l. Out of this sum the directors propose to pay a dividend at the rate of 15 per cent. per annum, and to add to the reser fund 5000l. (making that fund 15,000l.), carrying forward a balance of 2724l.

Registration of New Companies.

The following joint-stock companies have been duly registered:—

OSSETT FLOCKTON COAL COMPANY (Limited).—Capital 15,000l., in 10l. shares. To purchase from T. Tolson, E. Tolson, and Thomas Whitworth, the Ox Close Colliery, with the plant, &c., situate on the Ossett and Dewsbury Branch of the Great Northern Railway. The price paid is 5000l. The first seven subscribers are—John Whitaker, Ossett, farmer, 50; T. Tolson, Ossett, manufacturer, 100; B. Wilson, Ossett, manufacturer, 25; Joseph Fearnside, Stump Cross, Morley, near Leeds, colliery proprietor, 10; E. Tolson, Dewsbury, manufacturer, 100; J. Harrup, Wakefield, 50; C. T. Phillips, Ossett, rag merchant, 50. The qualification for a director is 10 shares.

IMPERIAL HOTEL COMPANY, BLACKPOOL (Limited).—Capital 40,000l., in 5l. shares. To acquire the Imperial Hotel at Blackpool, and to carry on the management of the same. The subscribers (who take one share each) are—A. Murray, Bradford, near Manchester; J. Syddall, 6, York-street, Manchester; J. R. Hampson, South Parade, Manchester; W. Jenkinson, India Buildings, Manchester; J. Collins, 76, King-street, Manchester; W. Bath, Market-street, Manchester; G. Jenkinson, India Buildings, Manchester.

CASTLE PACKET COMPANY.—This is an unlimited company formed to continue a partnership of steam-packet proprietors. The subscribers are—Donald Currie, 3 and 4, Fenchurch-street; James Currie, Leith; John Napier, Glasgow; John Cowar, Edinburgh; R. B. Mackie, Wakefield; W. Brand, Dundee; R. Cockerton, 83, Cornwall Gardens.

CHARGOLA TEA COMPANY (Limited).—Capital 44,000l., in 100l. shares. To acquire and carry on the cultivation of the Chargola tea estate, Province of Upper Assam. The subscribers are—T. J. P. Carter, Windsor, 10; G. Taswell, Stonerwood, Petersfield, 50; E. Taswell, 9, Montpelier-place, Bryanstone-square, 30; Raymond S. Paley, 6, Grosvenor Gardens, 70; Phillip Butler, Queensgate-terrace, W., 20; P. R. Buchanan, 21, Whitehall place, 50; Arthur Bryans, 24, Collingham-place, 50.

METROPOLITAN BICYCLE COMPANY (Limited).—Capital 10,000l., in 1l. shares. To acquire the business of Mr. T. W. Tupper, of West Croydon. The subscribers (who take one share each) are—C. J. Fox, East Temple chambers; H. A. Barrow, London-road, Clapham Junction; G. Borman, 9, Old Jewry; T. W. Tupper, West Croydon; H. Bath, Streatham; W. C. G. Walker, Mortimer-street, West Croydon.

SOUTH PARADE PIER COMPANY (Limited).—Capital 8000l., in 10l. shares. To construct a pier at East Southsea.

BOHEMIAN TIN MINING COMPANY (Limited).—Capital 20,000l., in 10l. shares. To adopt and carry out an agreement between Wilhelm Ree of the one part, and J. C. Newton of the other part, for the purchase of mines, land, and minerals in the communes of Abertham and Henzsturerten, Bohemia. The subscribers (who take one share) are—W. A. S. Westoby, Brussels, esquire; Octavius Ommanney, Bloxham, Banbury; B. T. Wing, Army and Navy Club, lieutenant; G. Kilgour, C.E., 27, Ashley-place, Victoria-street; F. Warren, 38, Parliament-street, architect; F. A. Pulbrick, 28, Avenue-road, Regent's Park, esquire; J. C. Newton, Canada Buildings, King-street, S.W., secretary. The directors are—Messrs. W. A. S. Westoby, H. T. Wing, and W. Ree, the qualification being 50 shares.

CHAMBER COLLIERY COMPANY (Limited).—Capital 399,900l., in 100l. shares. To acquire the Oak Chamber and Chadderton and Wood Park Collieries, Lancashire, and the whole of the goodwill and business of the proprietors. The subscribers are—John Lees, Higher Clarkesfield, Oldham, colliery proprietor, 2; J. Lees, Lower Clarkesfield, colliery proprietor, 1; E. B. Lees, Higher Clarkesfield, gentleman; J. A. Lees, Alkington Hall, Alkington, gentleman; J. L. Lees, Lower Clarkesfield, gentleman; J. H. Lees, Shaw, near Oldham, cotton spinner, 1; H. Lees, Alkington Hall, gentleman, 2. The directors are Messrs. John Lees, J. Lees, J. A. Lees, E. B. Lees, J. C. Lees, A. J. Lees, J. H. Lees, the qualification being 50 shares.

SUNDERLAND TRAMWAYS COMPANY (Limited).—Capital 60,000l., in 10l. shares. To construct tramways at Sunderland. The subscribers (who take ten shares each) are—J. W. Maclure, J.P., Manchester; A. J. Lambert, 9, Craven Hill; C. E. Davison, The Gastons, Bishop Stortford; H. Hughes, Lintern House, Leicester; J. F. Meston, 20, Spring Gardens, S.W.; D. Parrish, 19, Great Winchester-street; J. Humphreys, 13, Stratford-place.

HOLDSWORTH AND GIBB (Limited).—Capital 120,000l., in 20l. shares. To purchase the interest of Walter Gibb in a mill at Gunton, as well as in the business carried on at 46, George-street, Manchester, carried on under the style of Holdsworth and Gibb. The subscribers (who take one share each) are—W. Gibb, 46, George street, Manchester; M. Holdsworth, Eccles; John Gibb, Ellesmere Park, Eccles; J. Southworth, Eccles; George Wood, Waras Buildings, Deansgate, Manchester; G. S. Wood, Waras Buildings, Manchester; A. C. Woods, Waras Buildings; W. Angus, 46, George-street, Manchester.

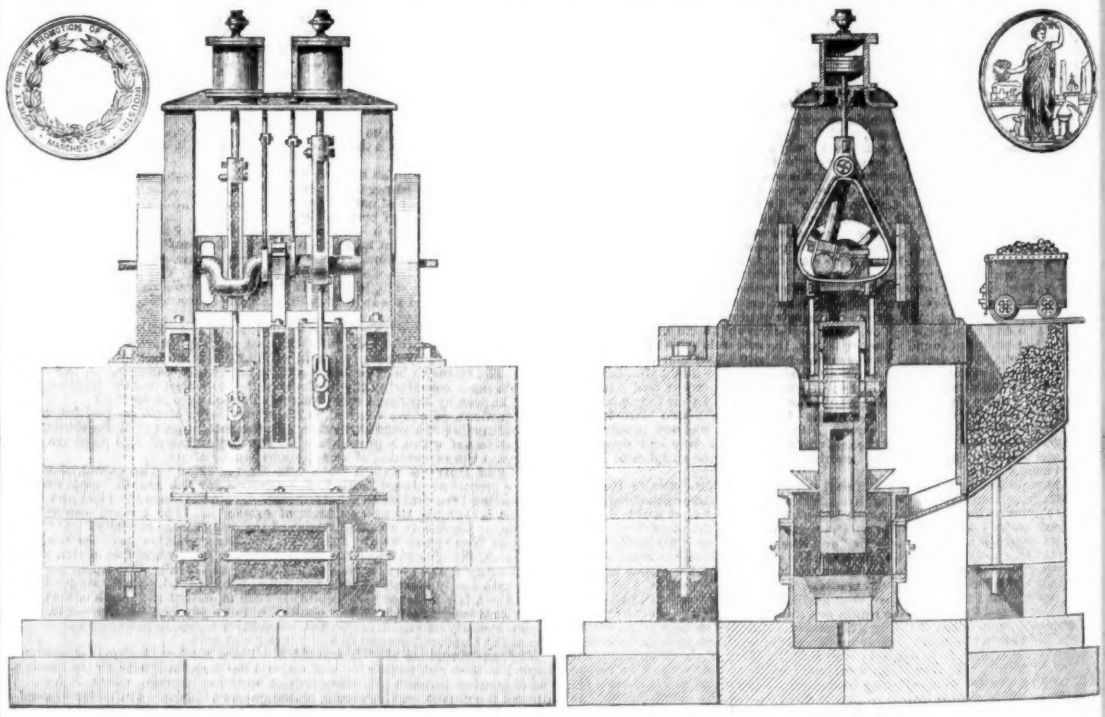
A TOY TELEGRAPH.—A correspondent, not without some degree of originality and appropriateness, thus describes the telephone:—"Not at all unlike the handle of a child's skipping rope, the bulging end containing the diaphragm and mouthpiece, and the handle itself containing the magnet, the telephone exhibited by Prof. Graham Bell struck one as being simplicity itself. And, to pursue this homely illustration, the two telephones used to illustrate the paper, one for the mouth and the other for the ear, joined together by a few yards of gutta-percha-covered copper wire, looked for all the world like a child's skipping rope—a veritable toy telegraph, in fact."

SAFETY GEAR FOR SIGNALS.—The essential features of novelty in the invention of Mr. J. E. ETLINGER, of the Great Indian Peninsula Railway, are that the gear is so constructed as to turn a signal on and off within a "minimum" space and time, and with an "interval" of rest between the turning on and the turning off of the signal. That applied to indicator signals of railway points, on a point being opened to "rather less" than the maximum allowed wheel play of (say) "one inch," the indicator is instantly turned on to "danger," that it "remains so" till the opposite point rail is "within" the same distance of closing, and is not fully turned off to "all right" till such point rail is well home and the points safe. That whereas the turning of indicator signals generally in use is "proportionate" to the movement of the points which extends from 4 to 5 in., the turning by means of the improved gear is reduced to a movement of the points not exceeding 1 in., the signal, therefore, indicating "danger" so long as the points are not practically safe to cross. This improved action is produced by a crank plate with slot fixed to the signal rod (or stem), and acted upon by a pin working in the slot and forming part of the draw-bar or other gear in use. For the ordinary full points a crank plate with two slots and two corresponding pins are required, whilst for single slip or catch rails a crank plate with one slot and one pin only are necessary.

IMPROVED MACHINE PULLEY.—To overcome the difficulty and loss of time occasioned in fixing split or divided pulleys made in halves an ingenious arrangement is proposed by Mr. J. MACKIE, of Reading, which consists in the construction of the periphery and arms of the pulley, which may be made of wrought iron, steel, or other metal, and the arms may be made of various shapes or forms. The boss or centre of the pulley is made in two pieces; into this boss the arms are inserted either by being cast, wrought, rivetted, or screwed. The arms are made either of double or single bars of wrought iron, steel, or other metal, and are fastened into the periphery of the pulley. The periphery itself is split or divided, but has only one opening or division by means of which it is opened, and when this is done the boss is also opened sufficiently to place the pulley upon the driving shaft or spindle, the elasticity of the periphery giving a sufficient opening of the half split or division in the same, and also of the boss to enable this to be accomplished. This expansion or opening may also be accomplished by means of a bow or hinge in the opposite side of the opening in the periphery or rim of the pulley, as well as by its own elasticity.

THE EMMA MINE.—From New York (Nov. 14) we learn that a motion for a new trial in the suit of the Emma Mining Company against Messrs. Park, Baxter, and others, to recover $5,000,000, the price of sale of the mine to the London stockholders, has been made in the United States Court. The arguments will come on subsequently.

EXTRAORDINARY RECKLESSNESS IN A MINE.—John Collier, of Ince, a young collier employed in the Saw-Mill Pit, belonging to the Ince Hall Coal and Cannel Company, was charged, at Wigan, with committing a breach of the Mines Regulation Act, by unlawfully using powder in the mine. On behalf of the prosecution it was proved by a lad, aged 13, a drawer, that defendant opened a cartridge when in the workings, and put the powder on some brattice cloth. He then took a wire and pushed it through the gauze of his safety-lamp, and having heated the wire put it to the powder, causing it to explode, and thus produce a flame. Defendant told the lad not to tell, as he would get six months, and the lad promised not to do so; but a few days ago defendant gave the lad a thrashing, and he thereupon told his mother, who communicated with the colliery officials. Safety-lamps only are used in the mine, and gas had often been found in the workings during the previous three months. The Bench said they would not send defendant to jail after a recommendation made by the prosecutor, and imposed a penalty of 40s. and costs. An explosion, by which 15 persons lost their lives, occurred at this pit three years ago.



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PNEUMATIC STAMPERS,

For Pulverising Tin and Lead Ores, Gold Quartz, &c.,

SOLE MAKERS FOR CORNWALL,

Messrs. N. HOLMAN AND SONS,

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All objectionable features of "wear and tear" common to the original and existing Pneumatic Stamps (driven by belts) are removed in this patent, and leather bands and stuffing boxes entirely dispensed with, the pneumatic piston being reciprocated into the compressing chambers by direct-action from without. These double machines are guaranteed to be of the capacity of 36 ordinary heads of cam and lifter stamps, and engineers will at once see that, inasmuch as the power is directly applied to its work (without the medium of belts and other gearing), the minimum consumption of coal (all other conditions being equal) must be the result.

The COST OF THESE MACHINES (including boiler) is about ONE-THIRD OF THE ORIGINAL CAM AND LIFTER STAMPS, to do the same work.

ROTARY STAMPERS ON THE SAME PRINCIPLE FURNISHED WHERE RUNNING GEAR EXISTS.

Also, SOLE MAKERS OF STEPHENS' PATENT PULVERISER.

MINING AND OTHER MACHINERY CONSTANTLY ON SALE,

NEW AND SECOND-HAND.

AWARDED THE PRIZE MEDALS AT LEEDS, MANCHESTER, AND WREXHAM EXHIBITIONS, 1875 AND 1876.

HADFIELD'S STEEL FOUNDRY COMPANY,

ATTERCLIFFE, SHEFFIELD,

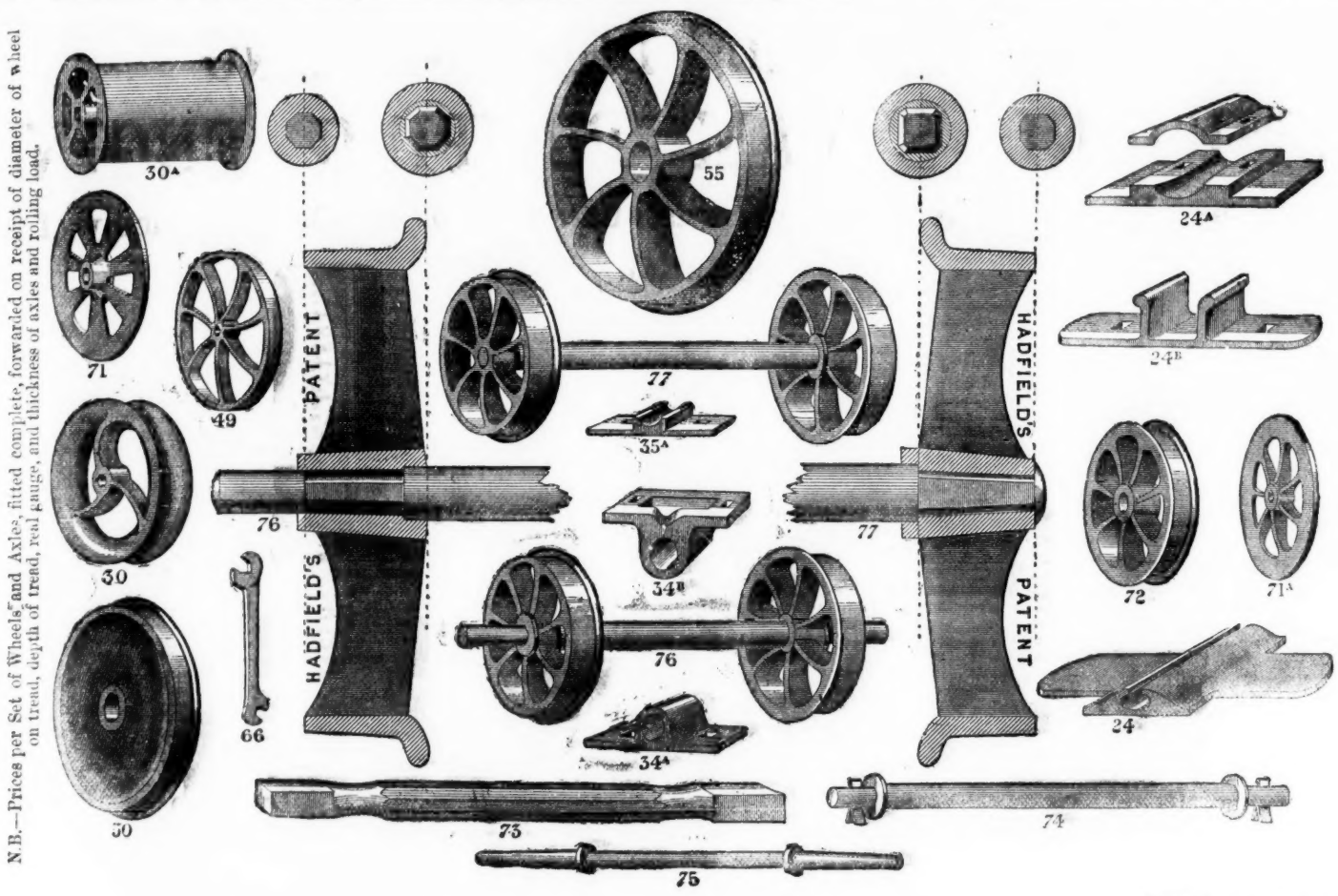
DEVOTE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF

CRUCIBLE STEEL CASTINGS, for Engineering and Machine Purposes,

AND ARE THE SOLE MAKERS OF

HADFIELD'S CRUCIBLE STEEL WHEELS.

One of our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders entrusted to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.



N.B.—Prices per Set of Wheels and Axles, fitted complete, forwarded on receipt of diameter of wheel on tread, depth of tread, real gauge, and thickness of axles and rolling load.

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The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very heaply fitted on, and run exceedingly true.

We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material.

CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one-half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will wear at least twelve times as long as Cast-Iron, thus saving animal and steam power, and reducing wear and tear immensely.

We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

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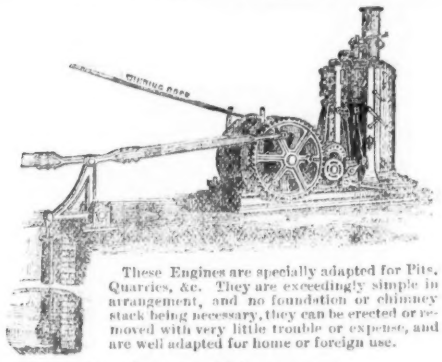
For Winding or Pumping, either separately or combined.



These Engines are specially adapted for Pits, Quarries, &c. They are exceedingly simple in arrangement, and no foundation or chimney stack being necessary, they can be erected or removed with very little trouble or expense, and are well adapted for home or foreign use.

Sizes from 6 to 25-horse power.

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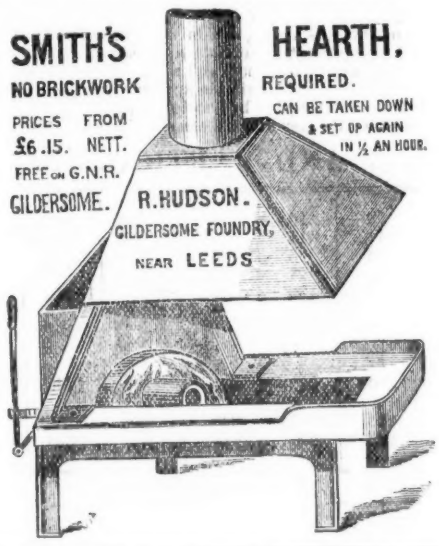

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MANUFACTURE RAILWAY CARRIAGES and WAGONS of EVERY DESCRIPTION, for HIRE and SALE, by immediate or deferred payments. They have also wagons for hire capable of carrying 6, 8, and 10 tons, part of which are constructed specially for shipping purposes. Wagons in working order maintained by contract. MANUFACTURERS also of IRONWORK, WHEELS, and AXLES. EDMUND FOWLER, Managing Director.

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WINDING ENGINES, NEW PRINCIPLE, best and most compact in the market. Several pairs ready.

PORTABLE WINDING AND SINKING ENGINES, the cheapest and most convenient and durable.

STEAM CAPSTANS AND HAULING ENGINES. The greatest power in the space of any made.

HORIZONTAL, VERTICAL, AND PORTABLE ENGINES. First-class make and low price.

PUNCHING, SHEARING, DRILLING, AND OTHER MACHINES.

Many of the above secondhand, very cheap.

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SOLID DRAWN BRASS BOILER TUBES

FOR LOCOMOTIVE AND MARINE BOILERS

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MUNTZ'S METAL COMPANY (LIMITED),

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CORNISH PUMPING, WINDING, AND STAMPING ENGINES; STEAM CAPSTANS AND CRUSHERS; WATER-WHEELS; PUMP-WORK; SHOVELS, AND HAMMERED IRON FORGINGS OF EVERY DESCRIPTION.

Also of SPUR, MORTICE, MITRE, BEVIL, and other WHEELS, of any diameter up to 12 feet, made by Scott's Patent Moulding Machine, without the aid of patterns, and with an accuracy unattainable by any other means.

MACHINERY or FOREIGN MINES carefully prepared.

SECONDHAND MINING MACHINERY, in good conditon, always on sale, at moderate prices.

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Beg to draw the attention of COLLIERY OWNERS and ENGINEERS to the Oils prepared by their special process. They never clog nor corrode, but keep the bearings cool and clean, and will be found the best and most ECONOMICAL LUBRICANTS at present in the market, being very DURABLE, UNIFORM IN QUALITY, and CHEAP. Prices, from 2s.

SPECIALLY ADVANTAGEOUS RATES FOR LARGE CONSUMERS.

References to many eminent firms who have used them constantly for years, amongst whom may be mentioned Sir W. Armstrong and Co.; Elswick Engine and Ordnance Works, Newcastle; R. Stephenson and Co., Engineers, Newcastle; R. and W. Hawthorn, Engineers, Newcastle; Hawkes, Crawshay, and Sons, Engineers, Gateshead-on Tyne; Abbot and Co., Engineers, Gateshead-on-Tyne.

Samples, prices, &c., on application. AGENTS WANTED.

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VIENNA INTERNATIONAL EXHIBITION, 1873.

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CORNWALL POLYTECHNIC SOCIETY, 1867 and 1873.

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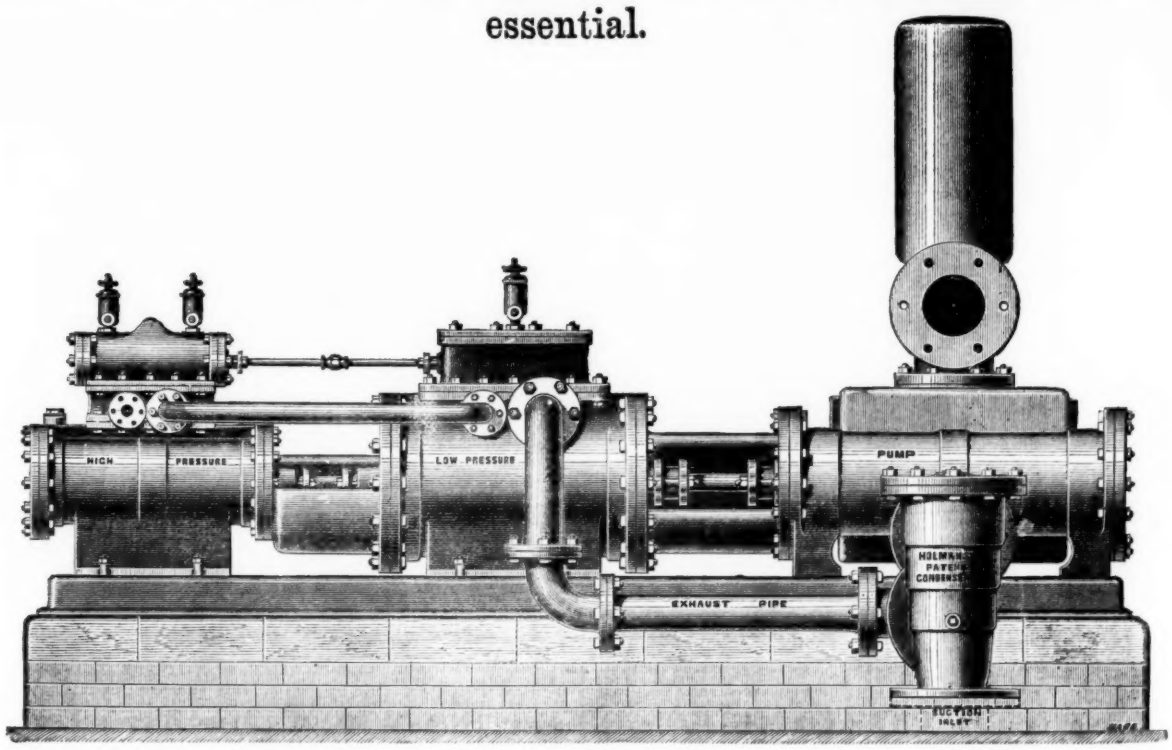
THE "SPECIAL" DIRECT-ACTING COMPOUND STEAM PUMPING ENGINE

For use in Mines, Water Works, Sewage Works, and all purposes where Economy of Fuel is essential.



After several years of successful application for all purposes to which steam-driven pumps can be applied, THE "SPECIAL" STEAM PUMP STILL MAINTAINS THE FIRST POSITION IN THE MARKET, notwithstanding that it alone—of all direct-acting pumps—has been subjected to the great variety of severe tests that must be encountered in such a period of time. Some valuable improvements have been suggested in the course of a long experience, and their adoption has rendered the apparatus at once

THE SIMPLEST AND MOST CERTAIN IN ACTION.

The illustration shows an extension of the principle of this Pump to a Compound Steam Pumping Engine, by which the economical advantages resulting from the expansion and condensation of steam are very simply and effectively obtained. The steam after leaving the high-pressure cylinder is received into and expanded in the low-pressure cylinder, and is thus used twice over before being exhausted into the condenser or atmosphere. The Engine combines simplicity, certainty of action, great compactness, fewness of parts, and consequent reduction in wear and tear.

Several thousands of the "Special" Steam Pumping Engines, with high-pressure cylinders only, are in use in British and Foreign Mines, Water Works, &c.,—and for confined situations, or where Engines of a comparatively small size only are necessary, they will still meet all requirements—but their application will be very largely increased, since it has been found practicable to embrace the important features of expanding and condensing the steam, so that increased power may be obtained, and the consumption of fuel greatly economised.

THE "SPECIAL" DIRECT-ACTING COMPOUND STEAM PUMPING ENGINE is the most simple appliance for deep mine draining and general purposes of pumping ever practically developed, and the first cost is very moderate compared with the method of raising water from great depths by a series of 40 to 50 fathom lifts. No costly engine-houses or massive foundations, no repetition of plunger lifts, ponderous connecting rods, or complication of pit-work are required, while they allow a clear shaft for hauling purposes.

SIZES AND PARTICULARS.

Diameter of High-pressure Cylinder.....In.	8	8	8	10	10	10	10	12	12	12	12	14	14	14	14
Ditto of Low-pressure Cylinder .....In.	14	14	14	18	18	18	18	21	21	21	21	24	24	24	24
Ditto of Water Cylinder .....In.	4	5	6	5	6	7	8	6	7	8	10	7	8	10	12
Length of stroke .....In.	24	24	24	24	24	24	24	24	24	24	24	36	36	36	36
Gallons per hour approximate	3900	6100	8800	6100	8800	12,000	15,650	8,800	12,000	15,650	24,450	12,000	15,650	24,450	35,225
Diameter Suction and Delivery .....In.	3	3½	4	3½	4	5	6	4	5	6	8	5	6	8	9
Diameter High-pressure Steam Inlet.....In.	1½	1½	1½	1½	1½	1½	1½	2½	2½	2½	2½	2½	2½	2½	2½
Diameter Low-pressure Steam Exhaust.....In.	1½	1½	1½	1¾	1¾	1¾	1¾	2½	2½	2½	2½	2½	2½	2½	2½
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder ..... Non-condensing..	360	330	160	360	250	184	140	360	264	202	130	360	275	175	122
Ditto ditto ditto—with Holman's Condenser...	480	307	213	480	333	245	187	480	352	269	173	480	367	234	162
Ditto ditto ditto—with Air-pump Condenser...	600	384	267	600	417	306	335	600	440	337	216	600	459	293	203

CONTINUED.

Diameter of High-pressure Cylinder .....In.	16	16	16	16	18	18	18	18	21	21	21	24	24	24	30	30
Ditto of Low-pressure Cylinder .....In.	28	28	28	28	32	32	32	32	36	36	36	42	42	42	52	52
Ditto of Water Cylinder .....In.	8	10	12	14	8	10	12	14	10	12	14	10	12	14	12	14
Length of stroke .....In.	36	36	36	36	48	48	48	48	48	48	48	48	48	48	48	48
Gallons per hour approximate	15,650	24,450	35,225	47,950	13,650	24,450	35,225	47,950	24,450	35,225	47,950	24,450	35,225	47,050	35,225	47,950
Diameter Suction and Delivery .....In.	6	8	9	10	6	8	9	10	8	9	10	8	9	10	9	10
Diameter High-pressure Steam Inlet .....In.	2½	2½	2½	2½	3	3	3	3	3½	3½	3½	4	4	4	5½	5½
Diameter Low-pressure Steam Exhaust.....In.	3	2	3	3	3½	3½	3½	3½	4	4	4	5	5	5	6½	6½
Height in feet water can be raised with 40 lbs. pressure per square inch in cylinder ..... Non-condensing..	360	230	160	118	456	292	202	149	397	276	202	518	360	264	562	413
Ditto ditto ditto—with Holman's Condenser...	480	307	213	154	603	389	269	198	528	363	269	691	480	352	750	550
Ditto ditto ditto—with Air-pump Condenser...	600	384	267	191	750	486	337	248	660	450	337	864	600	440	937	689

PRICES GIVEN ON RECEIPT OF REQUIREMENTS.

Any number of these Engines can be placed side by side, to work in conjunction or separately as desired, thereby multiplying the work of one Pump to any extent.

NORTH OF ENGLAND HOUSE ... ... TANGYE BROTHERS AND RAKE, ST. NICHOLAS BUILDINGS, NEWCASTLE-ON-TYNE.
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MANUFACTURERS OF

CRUCIBLE CAST STEEL CASTINGS,

HAVE PLEASURE IN CALLING THE ATTENTION OF THE MINING WORLD TO THEIR

Patent Method of Fitting up Cast Steel Wheels and Axles.

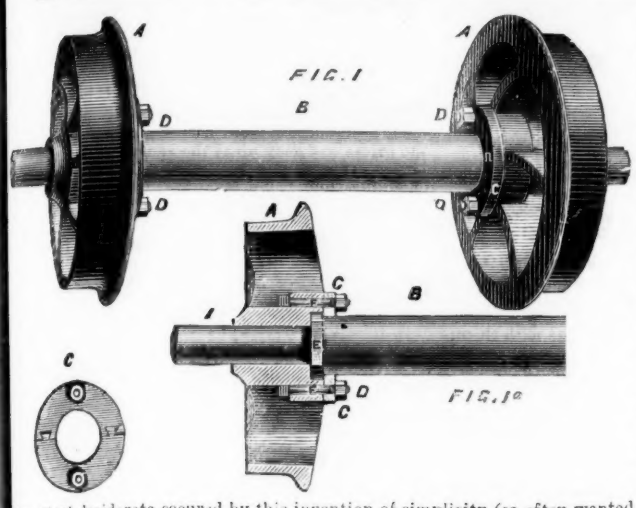


FIG. 1 FIG. 1a

Figs. 1 and 1a show a longitudinal view and plan of a pair of corf wheels and axles fitted up for outside bearings. A A, are the wheels; B, is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle. Figs. 2 and 2a show a longitudinal view and plan of a pair of corf wheels fitted up for inside bearings. The washers are secured to the boss of the wheel in outside bearings by bolts and nuts, and in inside bearings by set screws.

The advantages of the above system are:—A, the singular simplicity of fitting—enabling any inexperienced person, with the aid of a spanner or screw-driver, to detach the wheels from the axle or fit them together in a very short time. B, perfect solidity, the wheels and axles becoming as one piece. C, durability, no need or putting the wheels or axles into the fire, under any circumstances, which is so detrimental to wheels, rendering them remarkably brittle, and which under other systems are detached from the axle by the aid of fire. D, economy in fuel and wages, saving hundreds of pounds yearly to large coal owners. The

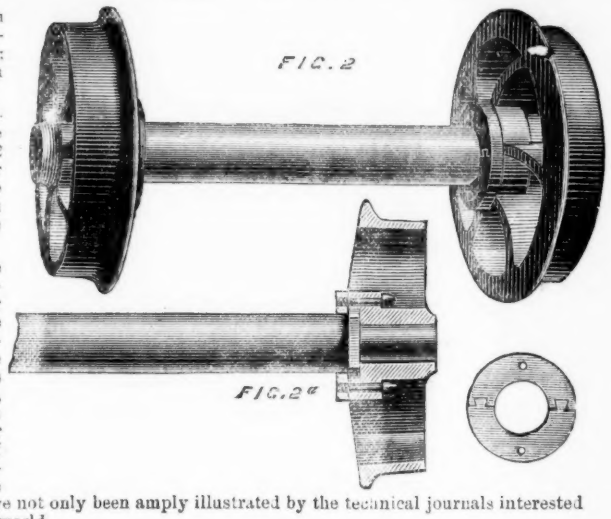


FIG. 2 FIG. 2a

important desiderata secured by this invention of simplicity (so often wanted in patents), solidity, durability, and economy, have not only been amply illustrated by the technical journals interested in the progress of mining operations in this country, but have at once been fully recognised by leading authorities in the mining world.

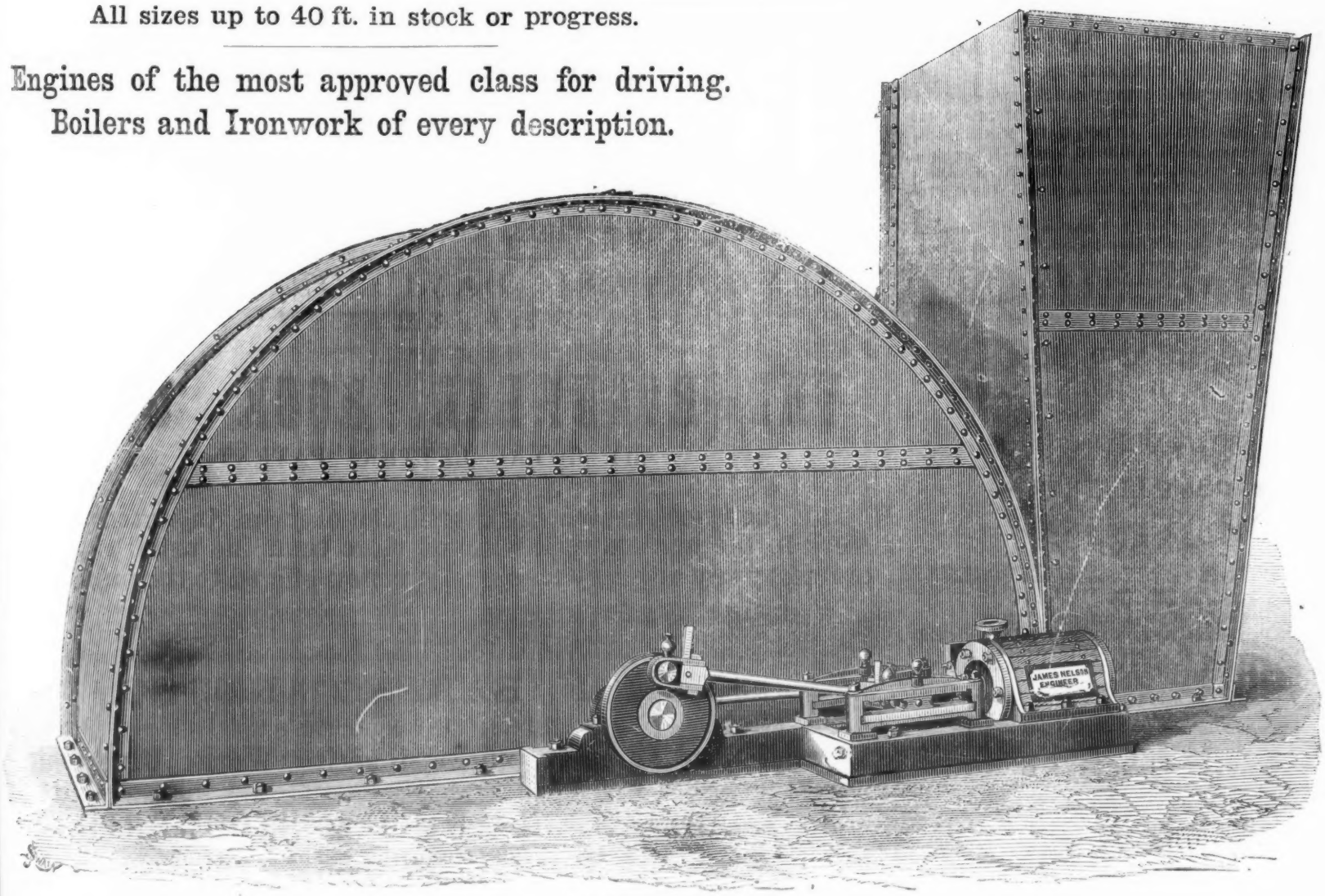
GUIBAL VENTILATING FAN

FOR COLLIERIES AND MINES.

PRICES AND PARTICULARS ON APPLICATION.

All sizes up to 40 ft. in stock or progress.

Engines of the most approved class for driving.
Boilers and Ironwork of every description.



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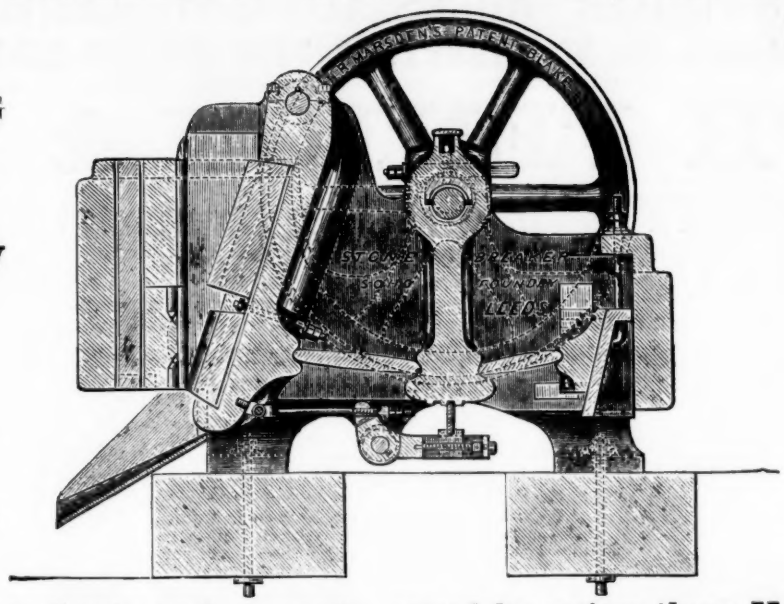

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USE THESE MACHINES

EXCLUSIVELY,

ALSO ALL THE GREAT

Mining Companies of the World.

H. R. M. has long observed the want of cheaper machines,

STONE AND ORE CRUSHERS,

And has at length, by means of improved appliances for the production thereof, been enabled to reduce the prices, yet keep up at the same time the well-known strength of construction. Reduced prices on application.

FIFTY per Cent., and upwards, saved by using these Machines.

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DEAR SIR,—We have adopted your Stone Breakers at many of the mines under our management, and are pleased to be able to state that they have in all cases given the greatest satisfaction. We are, yours faithfully, JOHN TAYLOR AND SONS.

H. R. Marsden, Esq.

Royal Agricultural Show, Liverpool, July, 1877.

DEAR SIR,—I have broken over 40,000 tons of very hard LIMESTONE into ROAD METAL, for the Newport and other Road Trusts, in your PATENT STONE BREAKER, AND ALL WITH ONE PAIR OF JAWS, which are STILL IN USE. I do not think at all, but am quite sure you are the only Machines which fully perform the work you set them out to do, and there are none in the Show can at all compare with them. Yours, truly, WILLIAM PRICE, Contractor, Gold Cliff, Monmouth.

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Patented July, 1875, and January, 1877.

Entire new principle, saving three-quarters to 2 cwts. "dead" weight per corve. Will hold 2 to 3 cwts. more coal than the ordinary kind, *without increasing the outside dimensions.* Can also be used as water tubs, and in thin seams are invaluable, as the height of the corves can be reduced without diminishing quantity of coal previously contained. In use, or on order, by the following coalowners—

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The company are also prepared to SUPPLY COMPRESSORS, and all necessary appliances for working the said Drills.

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By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

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